JULY 11, 1936

Railway Age

Founded in 1856

Reduce Future Maintenance Costs

On Wooden Superstructure Cars of This Type

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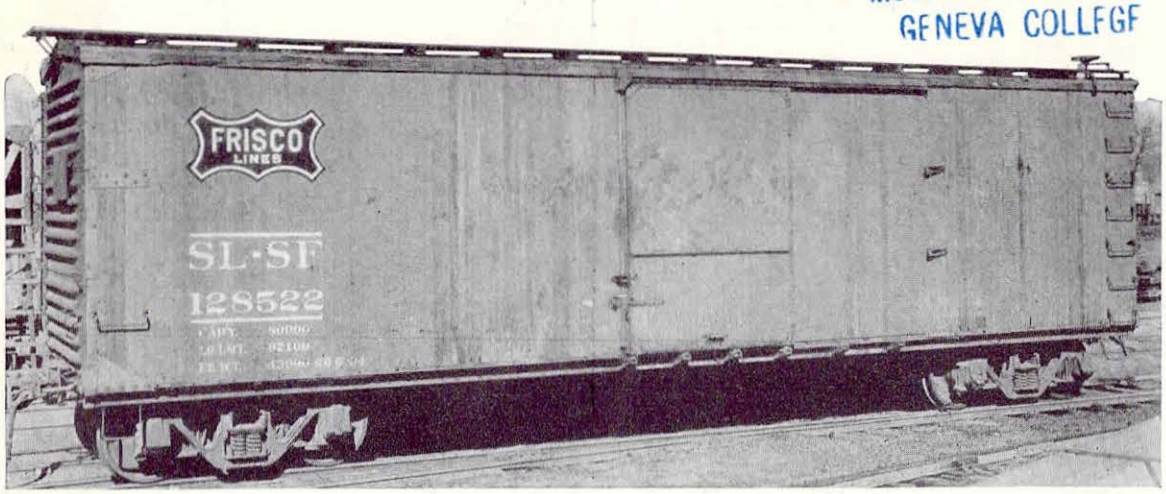
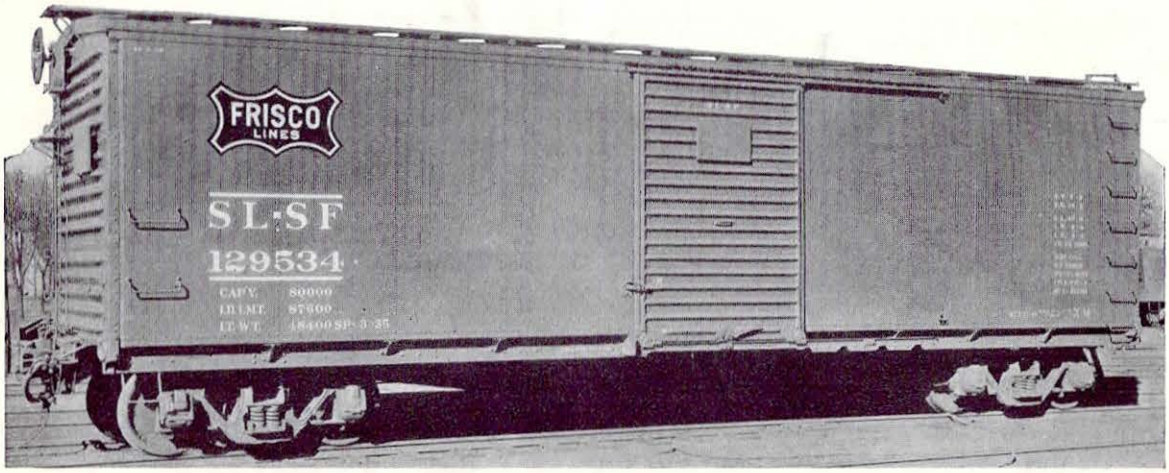


By Applying

Youngstown Steel Sides



Modern All Steel Cars Attract Business

YOUNGSTOWN STEEL DOOR COMPANY

Cleveland Chicago New York Youngstown

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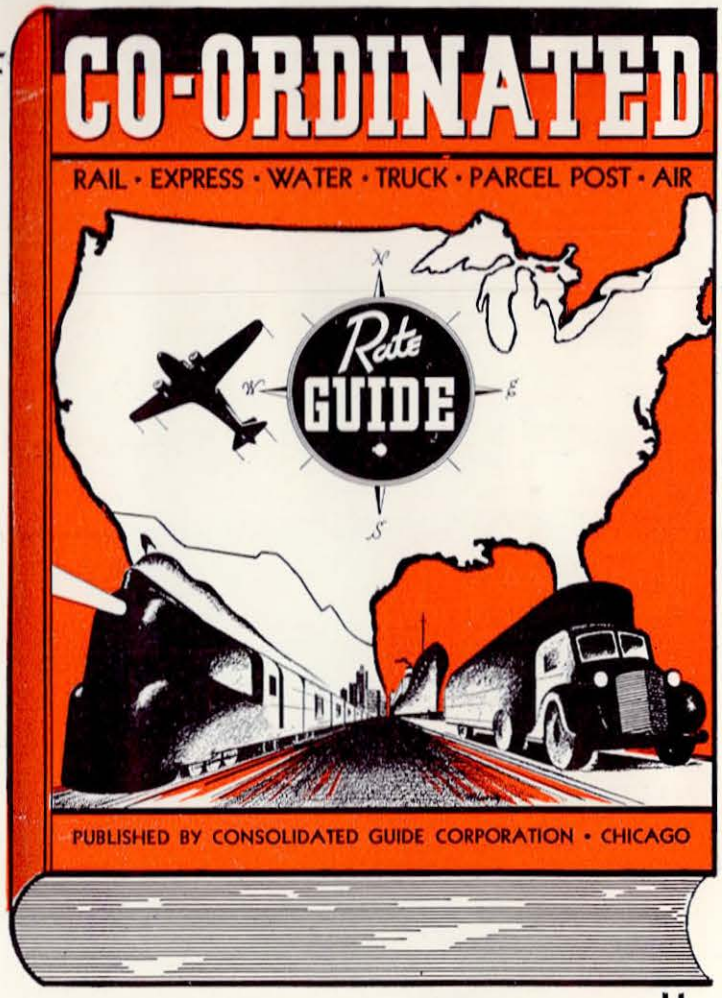
RAIL, AIR, EXPRESS PARCEL POST, WATER AND TRUCK RATES IN THE COMPLETE TRAFFIC GUIDE WITH Safety and SPEED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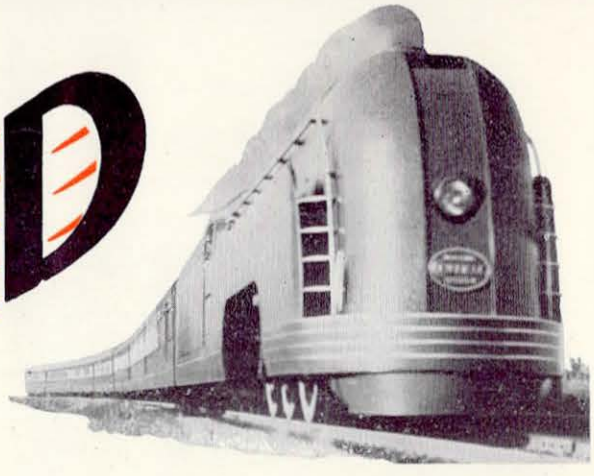

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Detailed transportation listings and *GUIDE* including scales of rates and emergency charges.

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Saves time—eliminates reference to numerous files and tariffs.
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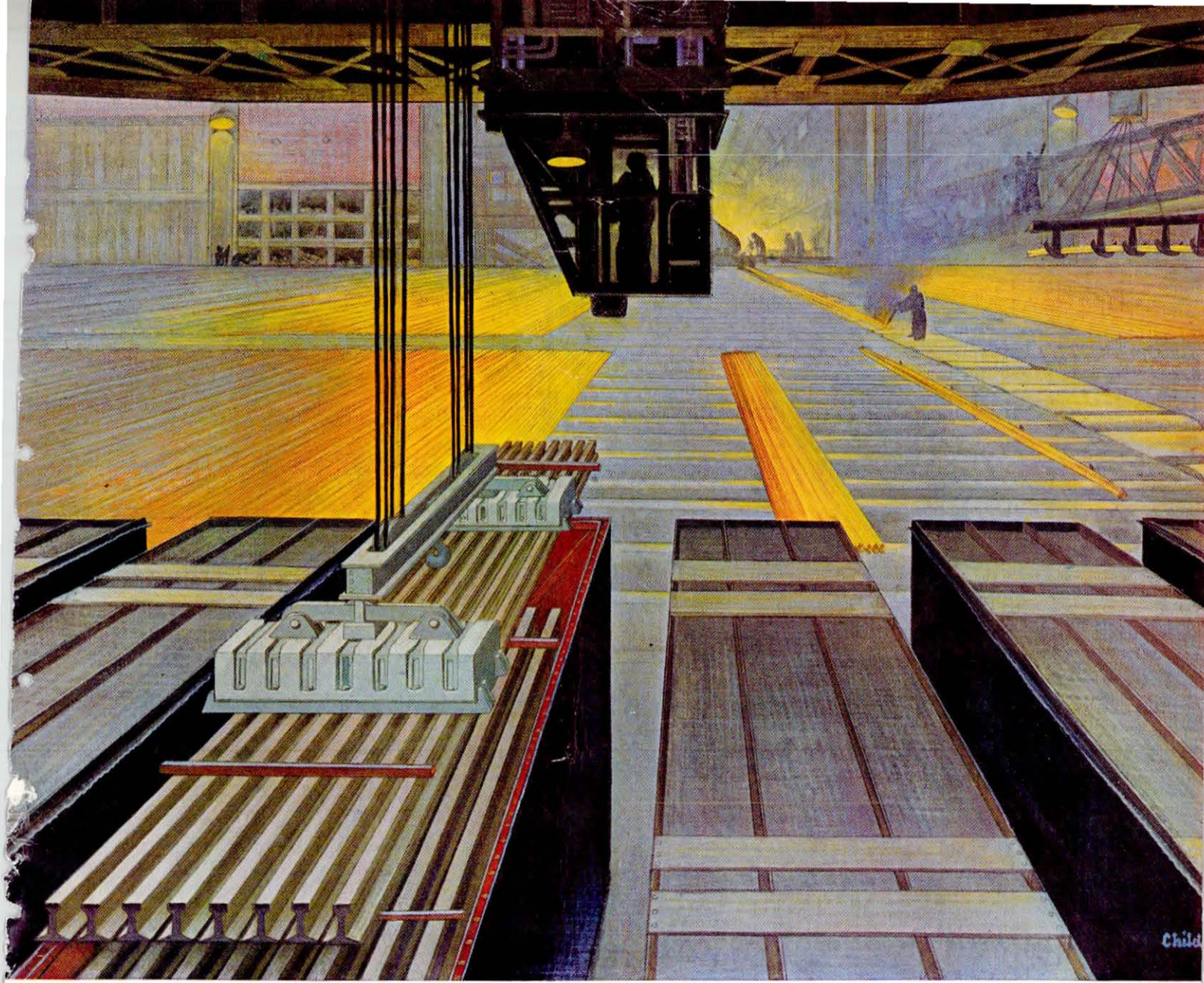


Production of rails by the Controlled Cooling process at a Bethlehem Steel Company plant. The electric magnet in the foreground is lowering a group of rails into a box where they will cool gradually. The rails in the background are cooling on the hot-beds preparatory to the box treatment.

NEW RAIL PROCESS that ends transverse fissures

BETHLEHEM is now producing rails by the Controlled Cooling process which has been developed to eliminate transverse fissures.

Breakage of rails, caused by transverse fissures, has been mounting steadily under the heavier rolling stock and greater speeds of modern railroading. The total of rail breakages or removal from track from this cause has been running at the rate of between four and five thousand annually, according to figures of the American Railway Engineering Association.

The prevention of this type of failure is particularly beneficial to railway transportation, because a transverse fissure starts internally and therefore is not visible until the damage has been done.

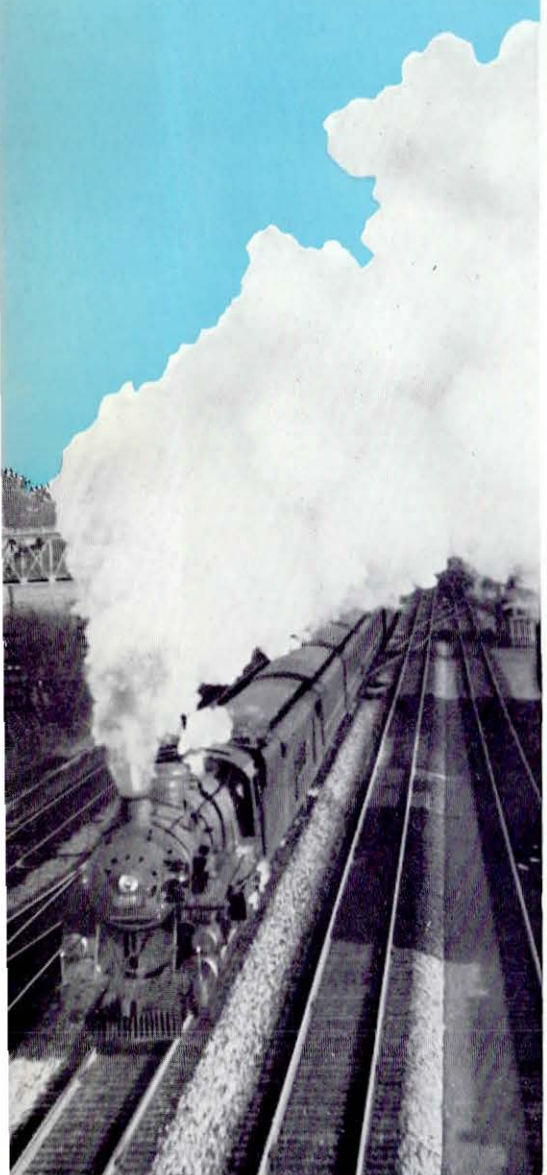
The Controlled Cooling process utilizes the discovery that transverse fissures are caused by shatter cracks which are sometimes found in rails cooled on the hot-beds in the ordinary way. This is now remedied by taking rails from the hot-beds at an elevated temperature and reducing their temperature gradually.

More than 200,000 tons of controlled cooled rails have been put into actual service without the reporting of a single transverse fissure failure.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Steel Products for Railways



PLATES — CARBON OR ALLOY STEEL

BETHLEHEM's plate-making skill has shown up particularly in the manufacture of nickel-steel boiler and firebox plates to meet the exacting requirements of the service in respect to both fabricating qualities and serviceability.

Whatever service conditions may be involved, whatever properties, physical or chemical, may be called for, Bethlehem has the men, the facilities and the experience that assure steel plates that measure up to all demands.

HEADS AND OTHER FLANGED PRODUCTS

LET Bethlehem supply your needs in the line of tank heads, boiler heads, dome sheets, manheads, yokes, saddles and miscellaneous flanged plate work.

The location of the Bethlehem Flanging Shop, with the plate mills and open-hearth furnaces of a large steel mill right at hand, makes it possible to fill large or small orders in any grade of steel with great speed.

CARBON STEEL BARS

IN making carbon steel bars Bethlehem pays special attention to the properties that make for high machinability, response to heat-treatment, and complete reliability.

A FULL RANGE OF STRUCTURAL SHAPES

BETHLEHEM Steel Company mills roll structural shapes for all the many uses in railway structures and equipment.

Bethlehem's complete range of structural shapes extends from 36-in. I-beams for single-span bridges down to the smallest angles and includes, in addition to the widely-used Bethlehem Wide-Flange Structural Shapes, American standard I-beams, Bethlehem Light Sections, equal and unequal angles, channels, tees and zees.

TRACK BOLTS AND SPIKES

BETHLEHEM makes bolts, nuts and related products for every railway requirement. Hot-forged nuts, track bolts, frog bolts, engine bolts, stay-bolts and super-heater bolts. Corrosion-resisting bolts, track spikes, turnbuckles, and many special items.

TRACK SPECIALTIES

FROGS and Switches, Switch Stands, Guard Rails, Gage Rods, Rail Anchors, and related equipment. Special Track Layouts.

WROUGHT-STEEL WHEELS

THE forging and rolling processes of manufacture give these wheels abundant strength and stamina for today's higher speeds. They can be furnished in the heat-treated condition.

BOILER TUBES

GENUINE old-fashioned charcoal-iron boiler tubes; double-pass steel tubes. Double-pass copper-bearing steel tubes.

BETH-CU-LOY SHEETS TO RESIST THE WEATHER

FOR roofing, siding and other uses where sheets are exposed to the weather, Beth-Cu-Loy is the ideal material. Beth-Cu-Loy Sheets are made of copper-bearing steel, the material which, impartial tests have shown, outlasts by two to two and one-half times steel made without the copper.

BUILDINGS

STEEL frame buildings of all descriptions.

BRIDGES OF ALL TYPES

Other Bethlehem Products for Railways

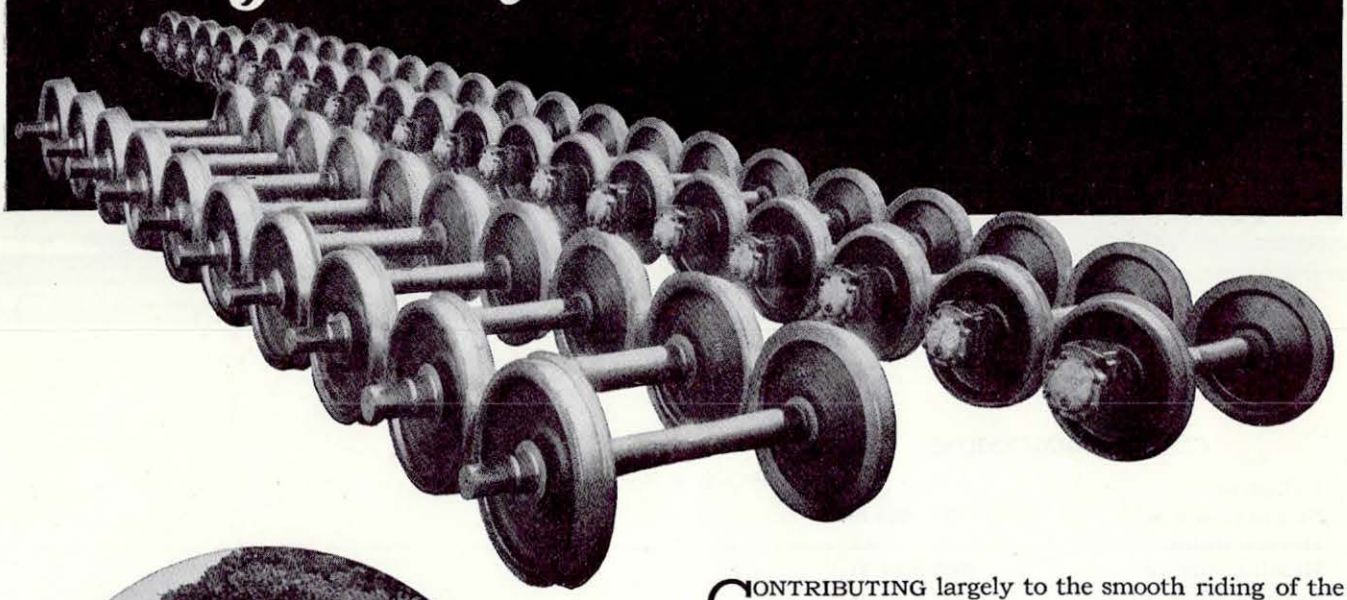
RAILS and Accessories, Steel Freight and Passenger Cars, Tool Steels, Alloy Steels, Forged Steel Axles, Steel H-Piling, Steel Pipe, Castings, Forgings, Wire and Wire Products, including Bethanized Fence for extra-long life in corrosive atmospheres.

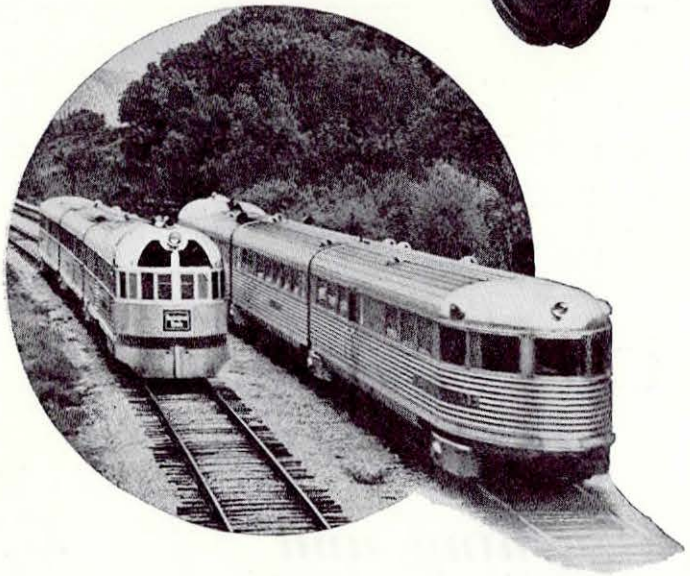
BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *District Offices:* Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Hartford, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

Wheels that help *Zephyrs* to justify their names





CONTRIBUTING largely to the smooth riding of the Burlington's swift Zephyrs is the precision with which the Bethlehem Wheels on which they roll are machined and matched with their axle-mates.

Besides the accuracy of finish to provide a ride as soft and smooth as the breeze the trains are named after, these wheels have the stamina to bear up under the rack and wear that go with 100 m.p.h. speeds.

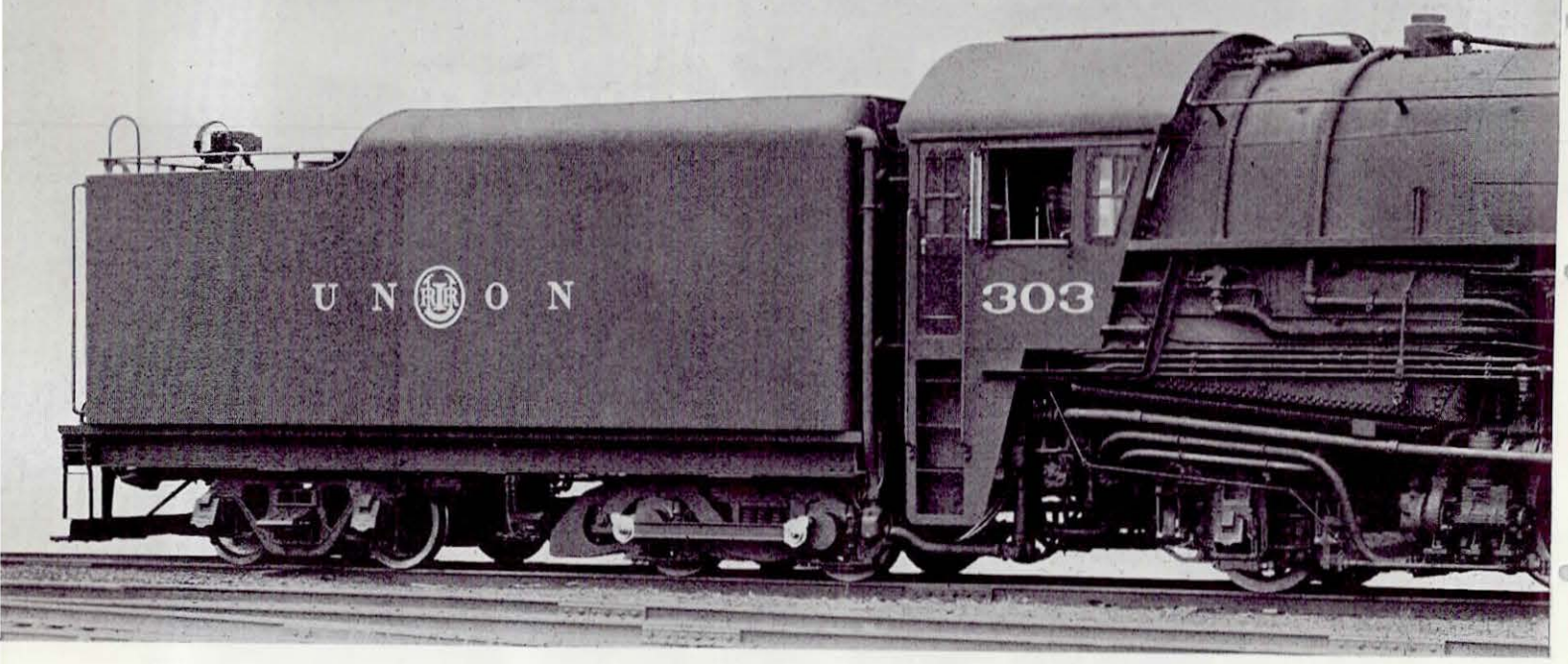
Whether the prime requisite in wheels is the combination of precision, light weight and strength for fast light-weight equipment, or extreme ruggedness for speeded-up conventional equipment, Bethlehem Heat-Treated Wrought-Steel Wheels will be found to measure up in every respect. They answer one of the problems of railroads today.

BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *District Offices:* Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Hartford, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

A new locomotive type–



GENERAL DIMENSIONS

Cylinders	28″ x 32″
Steam pressure	260 lb.
Drivers, diam.	61″
Heating surface	4808.2 sq. ft.
Superheating surface	1389 sq. ft.
Grate area	85.2 sq. ft.
Weight on drivers	343,930 lb.
Weight, total engine	404,360 lb.
Weight, eng. & tend.	644,360 lb.
Tractive force	90,900 lb.
Tractive force with booster	108,050 lb.

Baldwin Disc centers on main driving wheels.

UNION TYPE

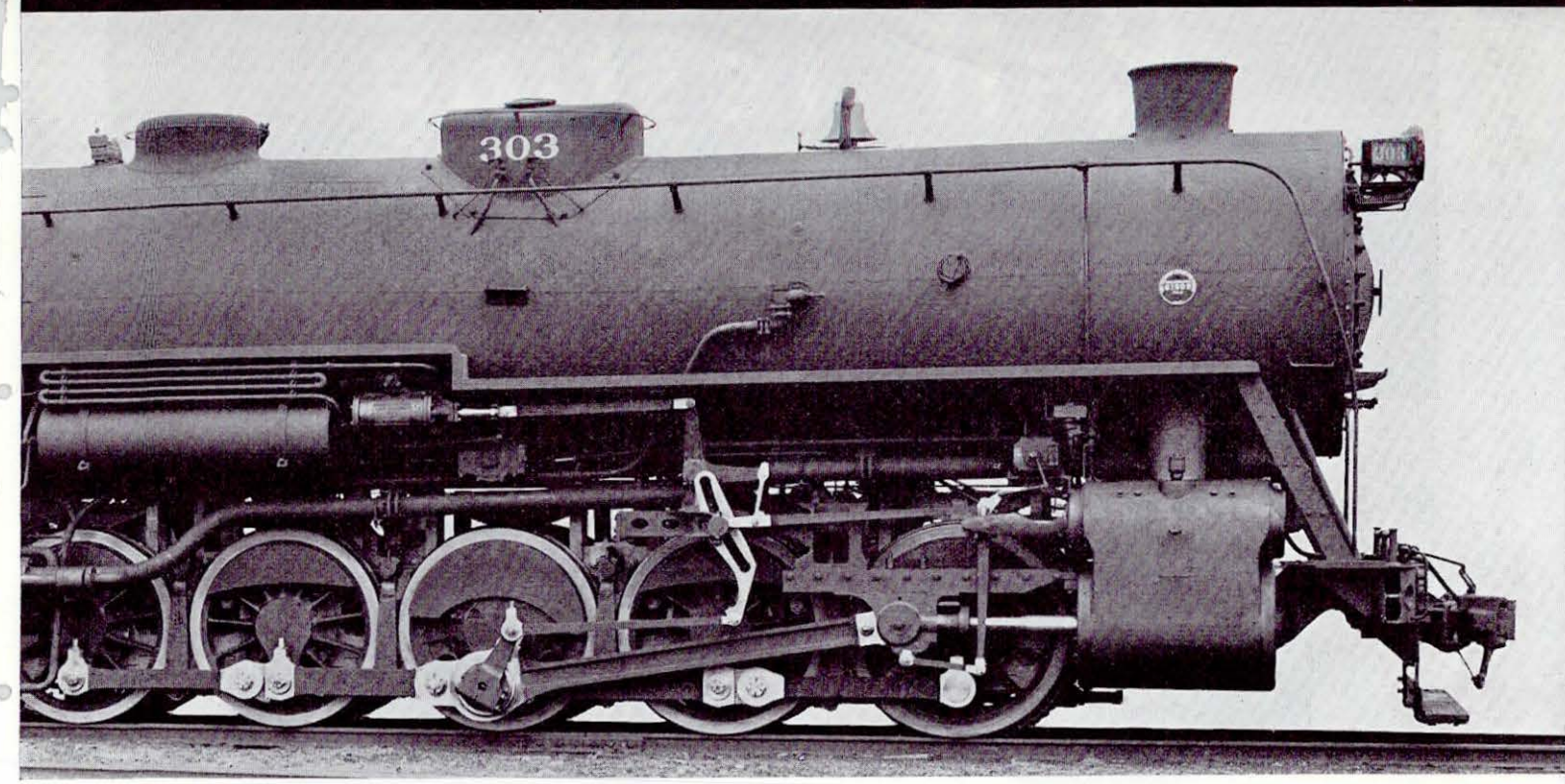
(0-10-2)

Switching and transfer locomotives

1936

THE BALDWIN LOCOMOTIVE

the "UNION"



The Union Railroad does a switching and transfer business in the Pittsburgh District, collecting and hauling train loads of ore, coal, limestone and mixed products to serve the steel industry.

Five "Union" type locomotives were ordered in February, 1936, to provide greater hauling capacity than existing power, eliminate helper service on grades and reduce the number of train movements.

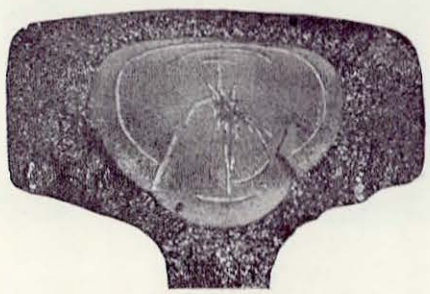
The last of these locomotives was shipped on July third. With a capacity of 3660 potential boiler horsepower and a tractive force of 108,050 at starting, it is believed that these "Union" locomotives will reach a new high level for efficiency and economy in heavy switching and transfer service.

It takes Modern Locomotives to make money these days!

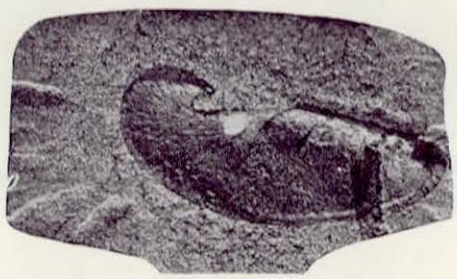
WORKS • • • PHILADELPHIA

Rail Testing and Railroad Safety

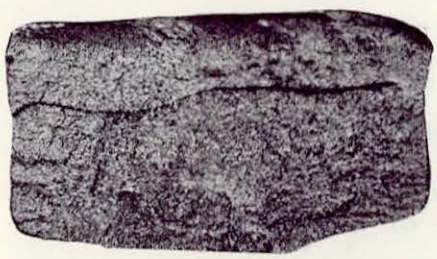
This year Sperry Detector Cars are finding an average of 45.5 defective rails per 100 track miles tested. For example:



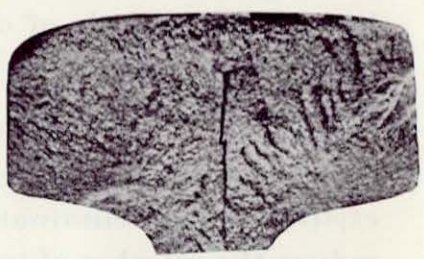
A Transverse Fissure
(21.7 per 100 track miles)



A Compound Fissure
(1.1 per 100 track miles)



A Horizontal Split Head
(8.5 per 100 track miles)

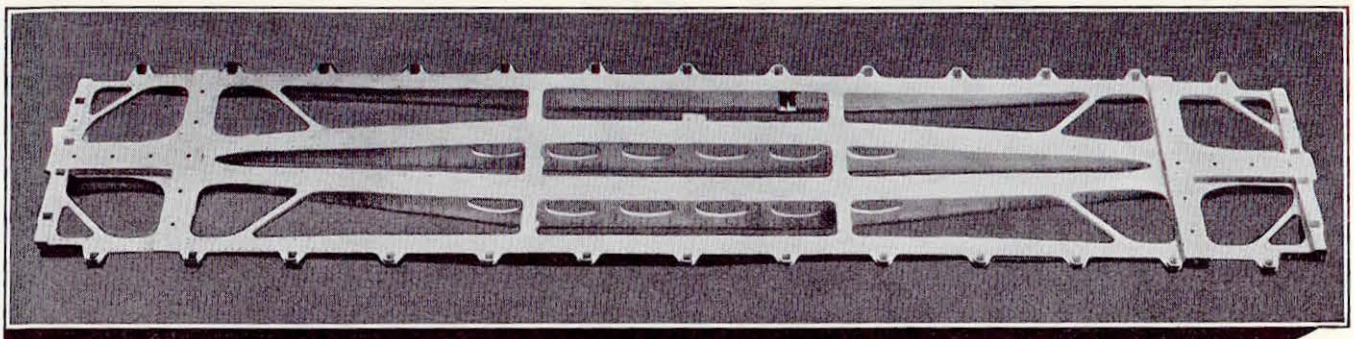


A Vertical Split Head
(14.2 per 100 track miles)

Testing with MODERN DETECTOR CARS— carrying all the latest improvements made possible by Sperry's research—gives the best assurance of MAXIMUM SAFETY of rails in track

SPERRY RAIL SERVICE

Brooklyn, N. Y. Chicago, Ill.



COMMONWEALTH

Cast Steel Underframes Provide

Desirable Construction For All Types Of Freight Cars

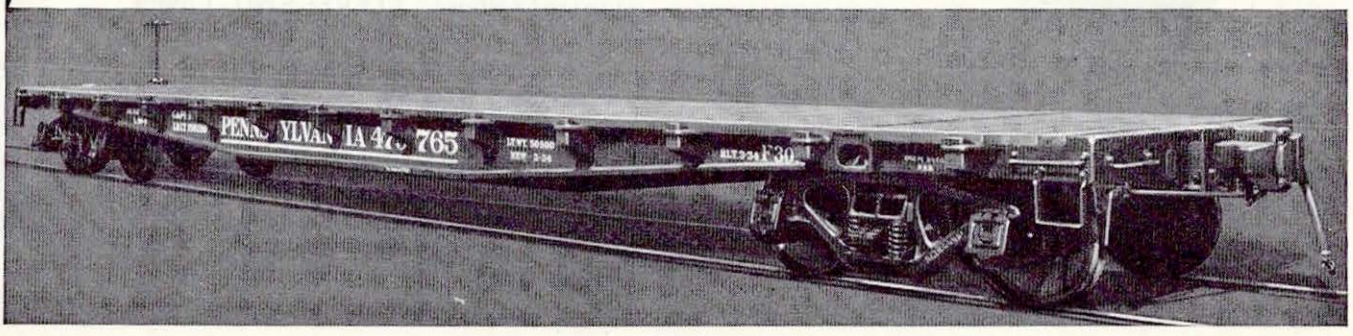
FLAT, Hopper, Automobile, Box and all other types of freight cars are better, stronger and more economical cars to maintain if the foundation is a COMMONWEALTH CAST STEEL UNDERFRAME.

Commonwealth Underframes withstand shocks and stresses, and eliminate the high underframe maintenance of built-up construction.

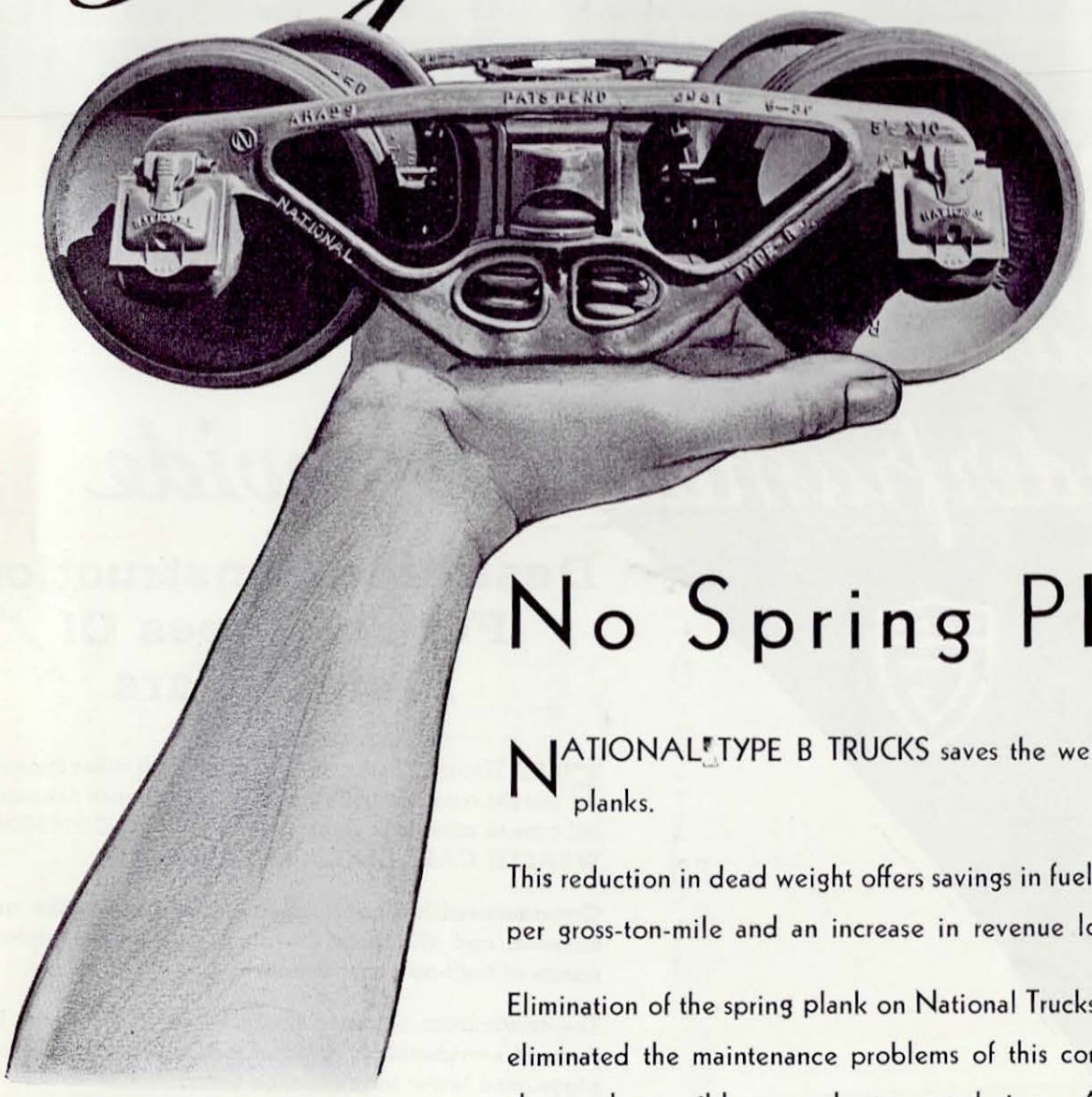
The advantages obtained include longer life of car, increased serviceability, greater mileage between shoppings, and lower maintenance costs.

General Steel Castings Corp.

Granite City, Ill. Eddystone, Pa.



Lighter—



No Spring Plank

NATIONAL TYPE B TRUCKS saves the weight of spring planks.

This reduction in dead weight offers savings in fuel consumption per gross-ton-mile and an increase in revenue load.

Elimination of the spring plank on National Trucks has not only eliminated the maintenance problems of this component, but also made possible a much stronger design. A deeper and wider bolster insures greater vertical and lateral strength.

REDUCE REPAIR COSTS WITH

NATIONAL MALLEABLE AND STEEL CASTINGS CO.

General Offices: CLEVELAND, OHIO

Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.
Canadian Representatives: Railway and Power Engineering Corporation, Ltd., Toronto and Montreal

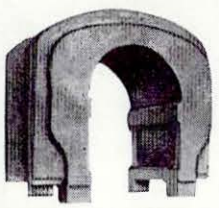
NATIONAL TYPE B TRUCKS

HYLASTIC

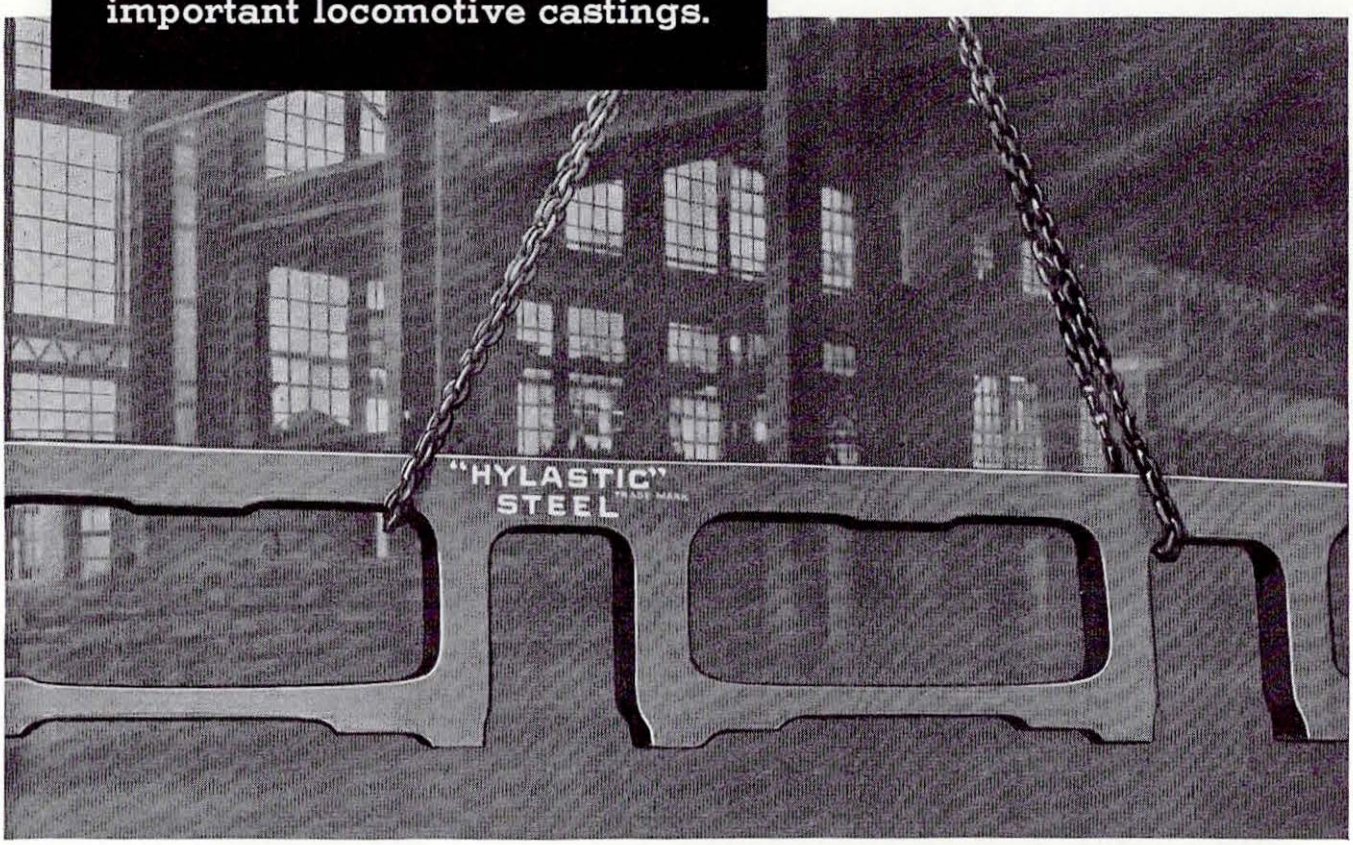
REG. U. S. PAT. OFF.

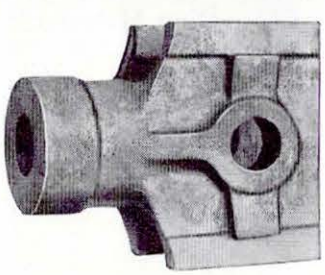
American Steel Foundries
High Tensile Cast Steel

The toughness and shock resisting qualities of "HYLASTIC" Steel is inherent; it defies sudden fracture. "HYLASTIC" Steel is the strongest and longest lasting material for all important locomotive castings.



LOCOMOTIVE DRIVING BOX





LOCOMOTIVE CROSS HEAD

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Trucks illustrated made by the following companies:

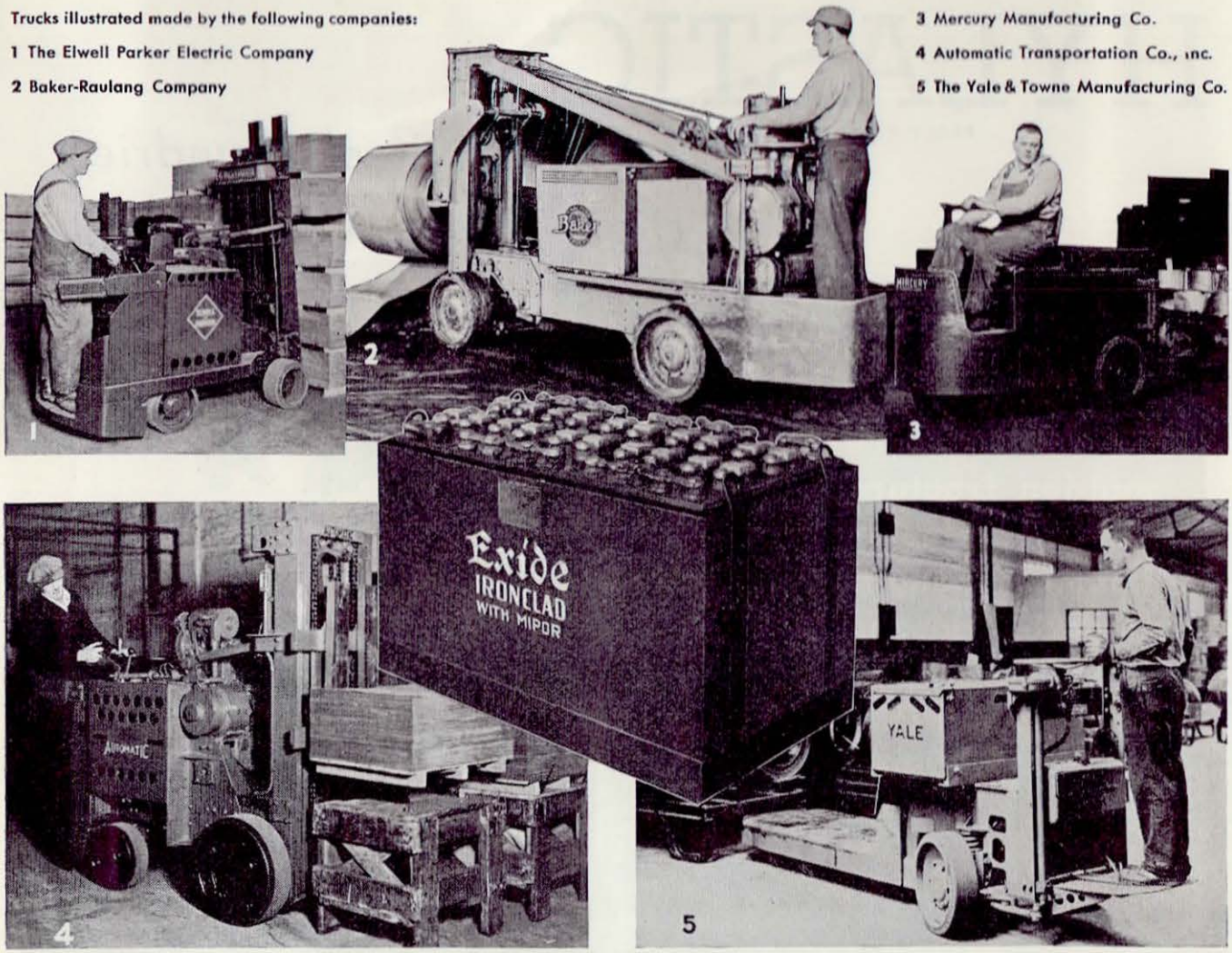
1 The Elwell Parker Electric Company

2 Baker-Raulang Company

3 Mercury Manufacturing Co.

4 Automatic Transportation Co., inc.

5 The Yale & Towne Manufacturing Co.



YOU'LL HANDLE MORE MATERIAL IN LESS TIME WITH EXIDE-IRONCLAD BATTERIES

FOR faster material handling service, equip your electric industrial trucks and tractors with Exide-Ironclads. You are sure of plenty of power for the heaviest load or grade . . . good speeds to the end of each working shift . . . and tireless performance free from delays and interruptions.

These batteries are famous for their ability to work long, hard and fast. They are sturdy and trouble-free . . . they hold maintenance costs to a minimum.

Combining all four of the essential battery characteristics—high power ability, high electrical efficiency, extreme ruggedness, and long life—Exide-Ironclads can improve your material handling service and cut costs. Why not write for free booklet, "The Efficient, Economical Method of Handling Material"?

THE ELECTRIC STORAGE BATTERY CO., Philadelphia

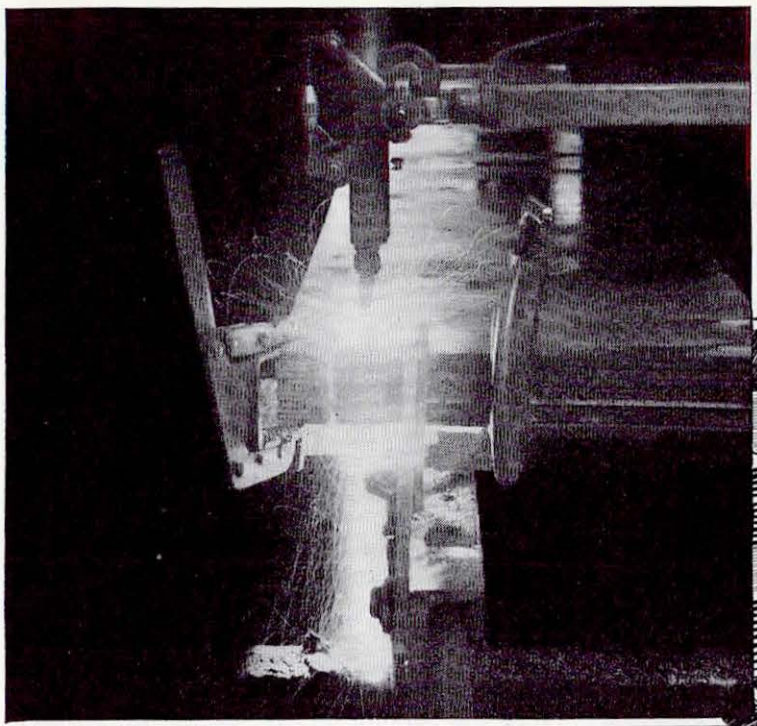
The World's Largest Manufacturers of Storage Batteries for Every Purpose

Exide Batteries of Canada, Limited, Toronto

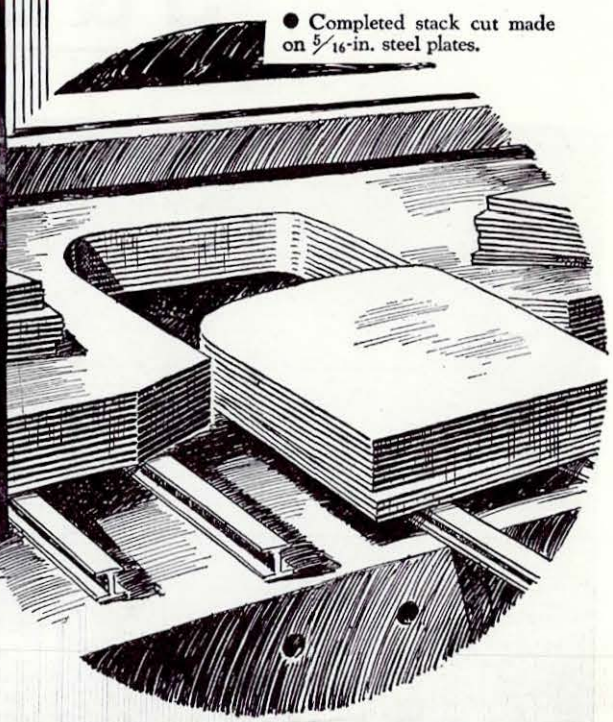
Exide
IRONCLAD
BATTERIES

With Exide **MIPOR** Separators

"MIPOR," Reg. U. S. Pat. Off.



● Stack cutting ¼-in. steel plates to shape. The plates are held by clamps.



● Completed stack cut made on 5/16-in. steel plates.

OXY-ACETYLENE STACK CUTTING

Speeds car fabrication and rebuilding

● Stacking the plates and oxy-acetylene cutting through the stack offers to railroads a speedy and economical method of cutting steel parts in multiple. Irregular shapes, straight line cuts, rings and circles can easily be formed by this method. Production costs both in cutting and in assembly are reduced—and by this process there is a further substantial saving through elimination of waste of material in the fabrication of plates and parts. Automatic machine stack cutting is finding increased use in the fabrication and rebuilding of railway cars largely because of developments perfected by Oxweld.

The Oxweld Railroad Service Company is prepared to assist its clients in utilizing this valuable process to best advantage. Oxweld customers benefit from the more than twenty years of experience and research in railroad welding and cutting of the Oxweld organization. The majority of Class I railroads of the country are Oxweld contract customers.

THE OXWELD RAILROAD SERVICE COMPANY

Unit of Union Carbide and Carbon Corporation

NEW YORK: Carbide and Carbon Building UCC CHICAGO: Carbide and Carbon Building

OXWELD RAILROAD SERVICE

Save Time AND Money THROUGH J & L Warehouse Service

Quick

Dependable Service on J&L Steel Products for Railroad Use

When you need steel quickly, for either emergency or regular requirements, you will save time, money and trouble by ordering from your J & L Warehouse.

J & L Warehouse service is fast and complete. Warehouses are strategically located to give you prompt service. Shipments are generally made immediately upon receipt of your order; always within 24 hours.

Warehouse stocks are diversified, complete and carefully classified as to qualities, and trained steel men know exactly what grade will best meet your need.

Special saws, shears, punches, and flame-cutting equipment in J & L Warehouses give you steel for your construction, maintenance and repair requirements in ready-for-use form. This saves time and money and helps you avoid costly delays in operations.

Many railroads look to J & L Warehouses for time and money-saving quick service. You, too, will profit when you order from your J & L Warehouse. Write for the J & L Warehouse combined stock list. No obligation.

J&L RAILROAD MATERIALS

Track Spikes . . . Tie Plates . . . Car Shapes and Plates, including Jal-Ten quality . . . Wire Products including Galvanized Dating Nails and Right-of-way Fence . . . Seamless Steel Boiler Tubes . . . Welded and Seamless Steel Pipe . . . Copper-Steel Pipe, Black and Galvanized . . . Hot Rolled Bars and Bar Shapes . . . Structural Shapes, including Lightweight Channels and Junior Beams . . . Forging Steel . . . Fabricated Structural Work . . . Bars for Concrete Reinforcement . . . Steel Piling . . . Cold Finished Steel . . . Shafting . . . Pig Iron.

FOURTH LARGEST STEEL PRODUCER IN THE UNITED STATES

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA
Sales Offices in all Principal Cities
Warehouses: CHICAGO CINCINNATI DETROIT MEMPHIS NEW ORLEANS NEW YORK (Long Island City)* PITTSBURGH
*Operated by National Bridge Works Division of Jones & Laughlin Steel Service, Inc.

J&L STEEL

ON any modernization program, full return for every dollar of the appropriation can be insured with AmCreCo products which offer —at low cost—durability, strength, adaptability and low maintenance cost. Many years of service on scores of railways have established, beyond question, the advantages of AmCreCo poles, ties, piles and timbers in construction and maintenance work.

AMERICAN CREOSOTING COMPANY

INCORPORATED

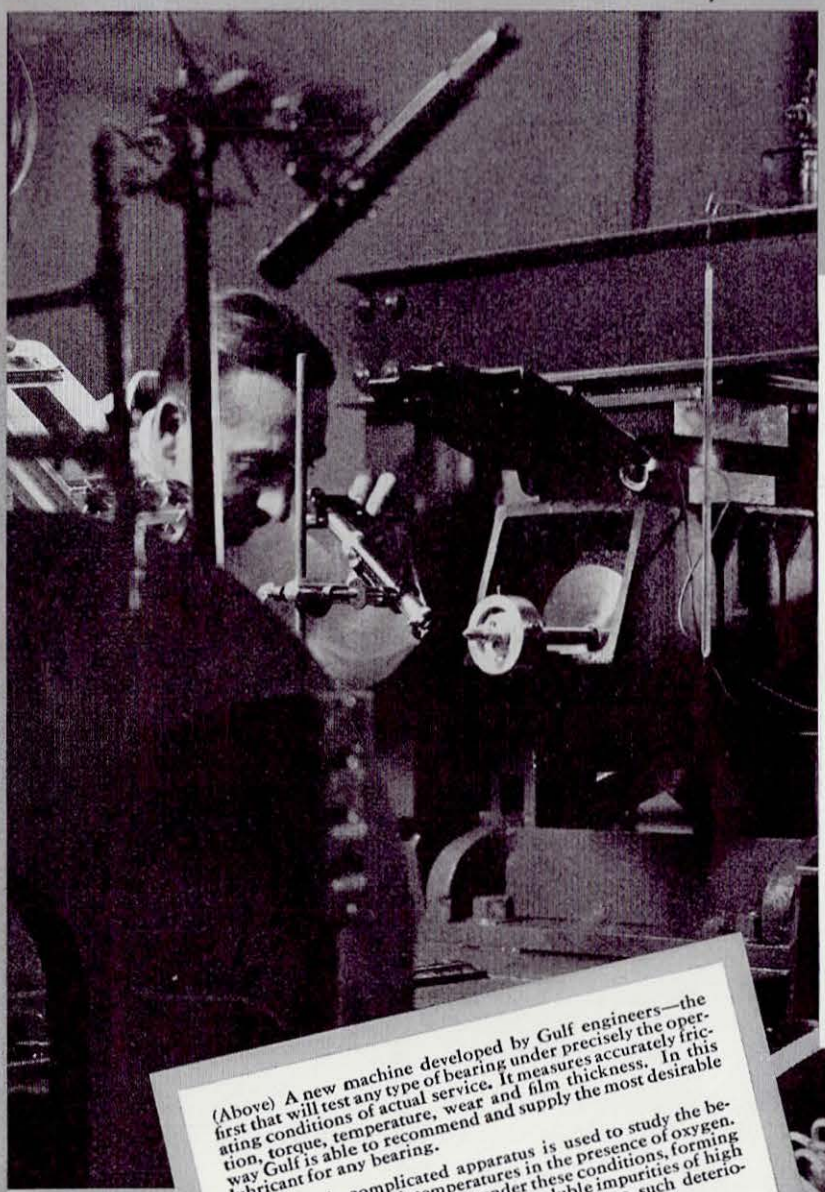
COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE — KENTUCKY

Behind the Quality of
GULF RAILWAY LUBRICANTS
is the world's most modern petroleum research laboratory



(Above) A new machine developed by Gulf engineers—the first that will test any type of bearing under precisely the operating conditions of actual service. It measures accurately friction, torque, temperature, wear and film thickness. In this way Gulf is able to recommend and supply the most desirable lubricant for any bearing.

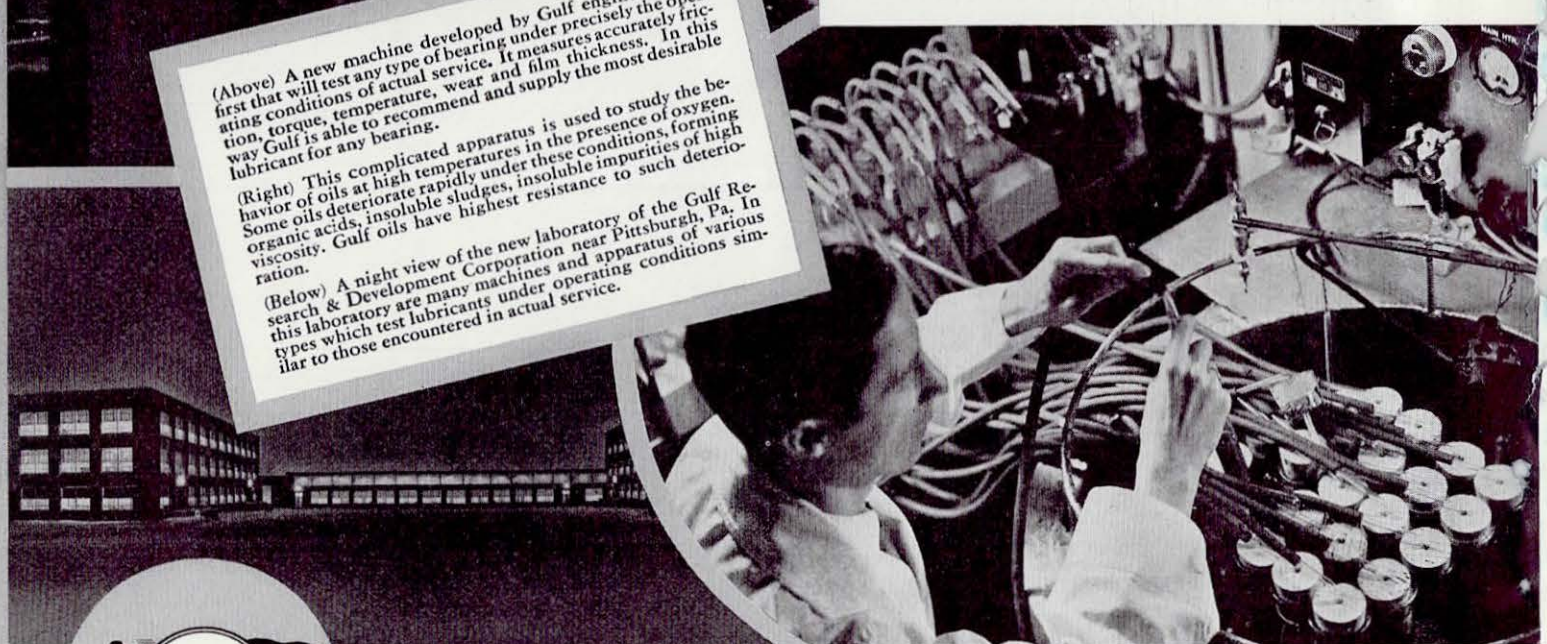
(Right) This complicated apparatus is used to study the behavior of oils at high temperatures in the presence of oxygen. Some oils deteriorate rapidly under these conditions, forming organic acids, insoluble sludges, insoluble impurities of high viscosity. Gulf oils have highest resistance to such deterioration.

(Below) A night view of the new laboratory of the Gulf Research & Development Corporation near Pittsburgh, Pa. In this laboratory are many machines and apparatus of various types which test lubricants under operating conditions similar to those encountered in actual service.

WHAT chemical changes take place in an oil under severe service? What is the best lubricant for a particular type of bearing? Does the lubricant meet the demands of actual service conditions?

Gulf scientists are finding the answers to these and thousands of other questions regarding railway lubricants in Gulf's modern research laboratory, shown below. Here many types of experimental machines duplicate the conditions under which oils perform in actual service.

This research is of great assistance in perfecting railway lubricants of highest quality. New products are constantly developed to keep abreast with the demands of higher speeds and longer hours of service.

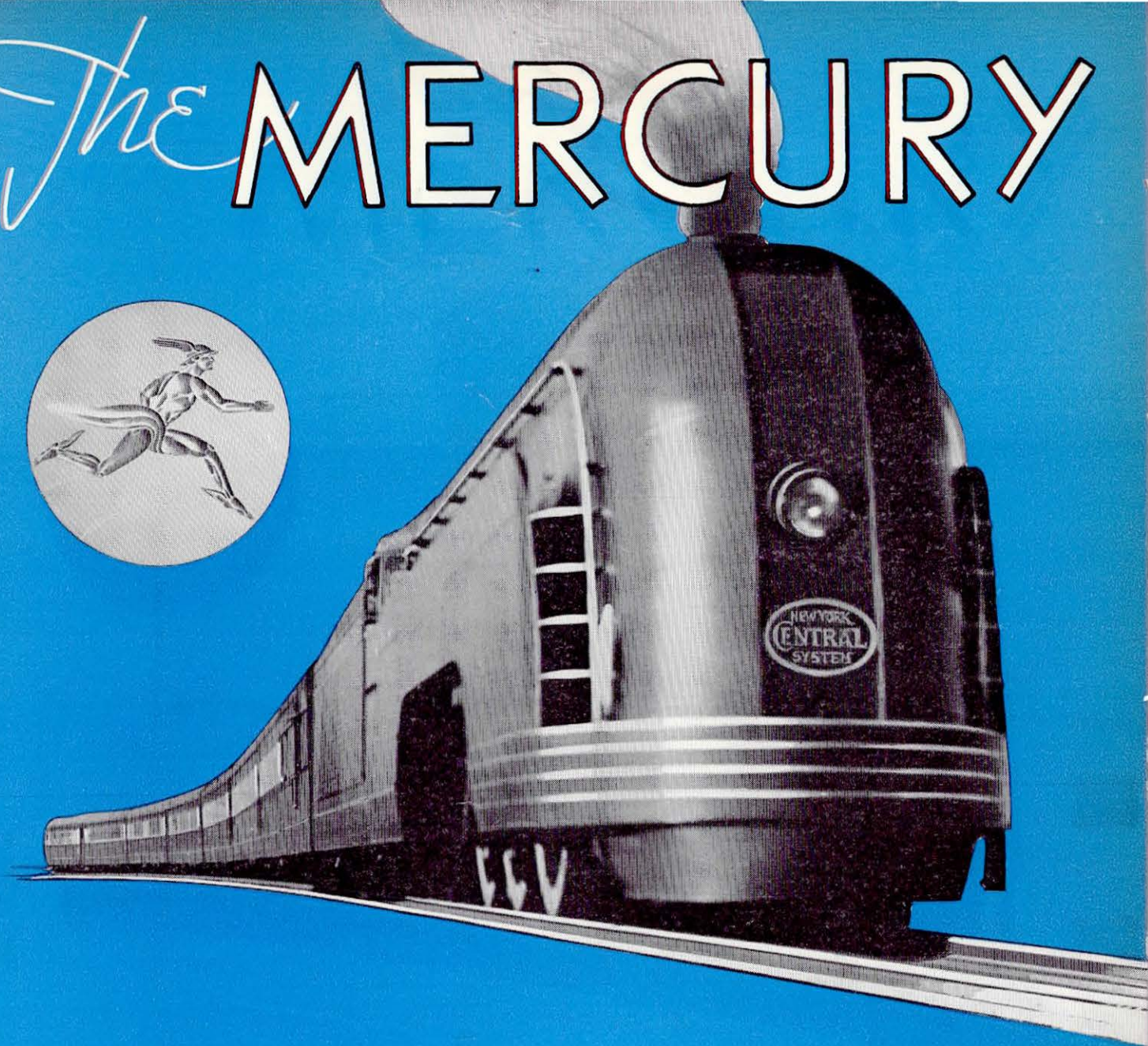


GULF INDUSTRIAL LUBRICATION

GULF OIL CORPORATION—GULF REFINING COMPANY

GENERAL OFFICES, GULF BUILDING, PITTSBURGH, PA.

The MERCURY



"The Train of Tomorrow"

• New York Central presents a new high in modern trains—the latest development in swift, comfortable travel—The MERCURY.

• From end to end it is custom-built. Its locomotive, and every piece of furniture in its luxurious coaches, lounge cars, parlor car and diner, and all its china, silverware and glassware were designed especially for it. The MERCURY is completely streamlined. Cool, clean air is provided by the most modern air-conditioning equipment.

• This train interprets the present in terms of the future. The MERCURY is truly "the train of tomorrow." Here is the schedule.

Eastern Standard Time

	Daily
Lv. Cleveland	7:30 A.M.
Ar. Toledo	9:15 A.M.
Ar. Detroit	10:20 A.M.

	Except Sunday	*Sunday Only*
Lv. Detroit	5:35 P.M.	6:30 P.M.
Ar. Toledo	6:35 P.M.	7:30 P.M.
Ar. Cleveland	8:25 P.M.	9:20 P.M.

NEW YORK CENTRAL SYSTEM

NEW YORK CENTRAL SYSTEM

VALVE PILOT OPERATION

The Operation of Tomorrow

for

The MERCURY

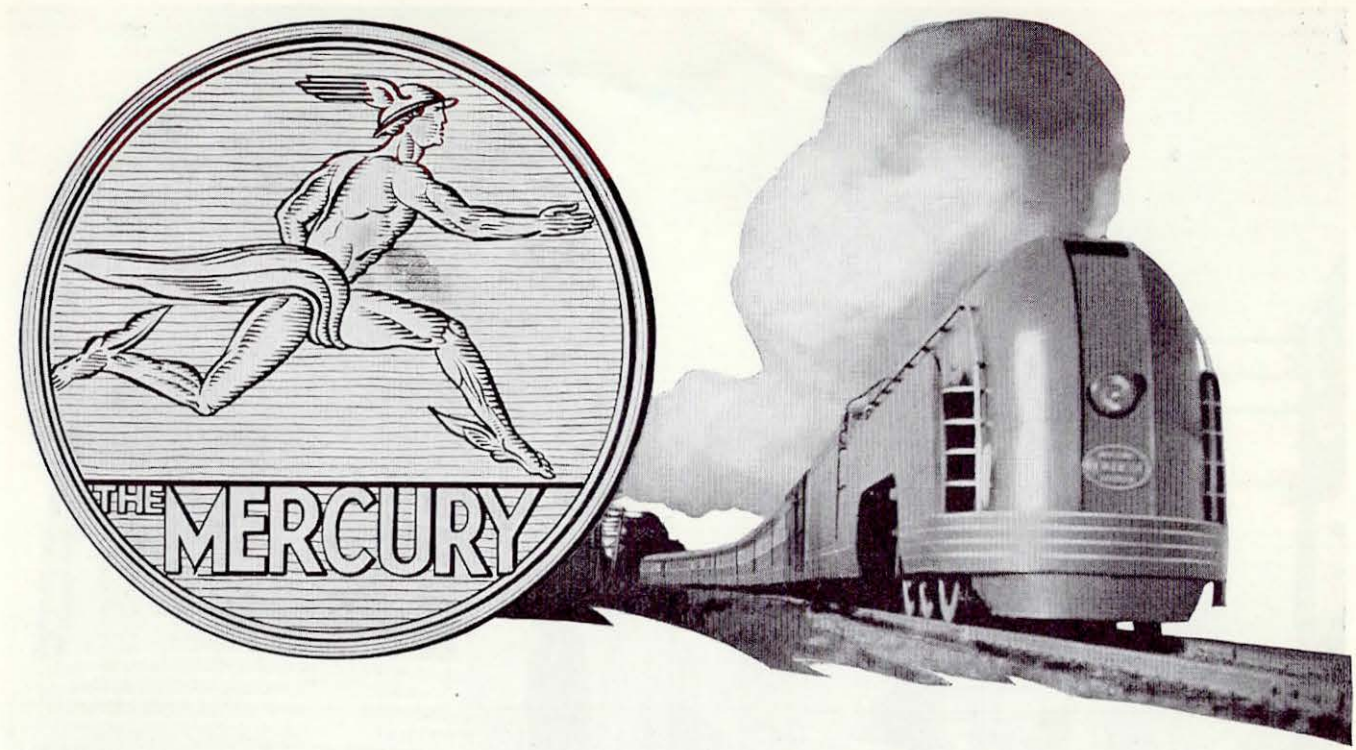
The Train of Tomorrow

VALVE PILOT CORPORATION

230 Park Avenue, New York, N. Y.

Sales Representatives: The Baldwin Locomotive Works, Philadelphia, Pa.

The MERCURY
NEW YORK CENTRAL SYSTEM



HSGI Parts on the Latest Streamliner

THERE are many new innovations on "The Mercury"—New York Central's contribution to modern passenger transportation.

But, the vital wearing parts on the locomotive are made from an accepted wear resisting material which has been serving American industry over one hundred years.

All the vital parts in the valves and cylinders—Bushings, Bull Rings and Packing Rings, are made from HUNT-SPILLER *Air Furnace* GUN IRON—the Crosshead Shoes are also made from this wear resisting material.

The more severe the requirements, the more the railroads depend upon HUNT-SPILLER *Air Furnace* GUN IRON for dependable performance, economical fuel consumption and low maintenance costs.

HSGI
Reg. U. S. Trade Mark
Cylinder Bushings
Pistons or Piston Bull Rings
Valve Bushings
Valve Packing Rings
Valve Bull Rings
Crosshead Shoes
Hub Liners
Shoes and Wedges
Floating Rod Bushings
Parts Finished For Application
Dunbar Sectional Type Packing
Duplex Sectional Type Packing for Cylinders and Valves
(Duplex Springs for Above Sectional Packing)
Cylinder Snap Rings
Valve Rings All Sha...

HUNT-SPILLER MFG. CORPORATION
J. G. Platt Pres. & Gen. Mgr. / V. W. Ellet Vice-President

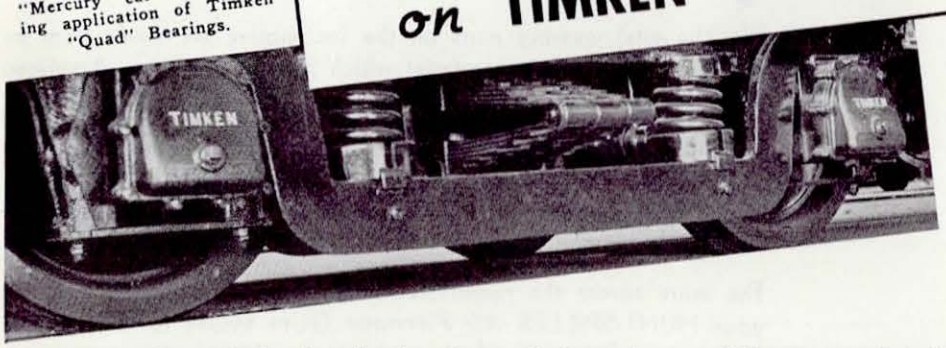
Office & Works
383 Dorchester Ave. South Boston, Mass.
Canadian Representative: Joseph Robb & Co., Ltd., 5575 Cote, St. Paul Rd., Montreal, P. Q.
Export Agent for Latin America:
International Rwy. Supply Co., 30 Church Street, New York, N. Y.

HUNT-SPILLER GUN IRON
Air Furnace

The MERCURY

NEW YORK CENTRAL SYSTEM

The "MERCURY" speeds on TIMKEN BEARINGS



"Mercury" car truck showing application of Timken "Quad" Bearings.

Winged wheels take the place of winged feet as this new flyer of the New York Central Lines glides swiftly, smoothly and surely to its destination. The Mercury of ancient mythology is outdone by the modern Mercury of the rails.

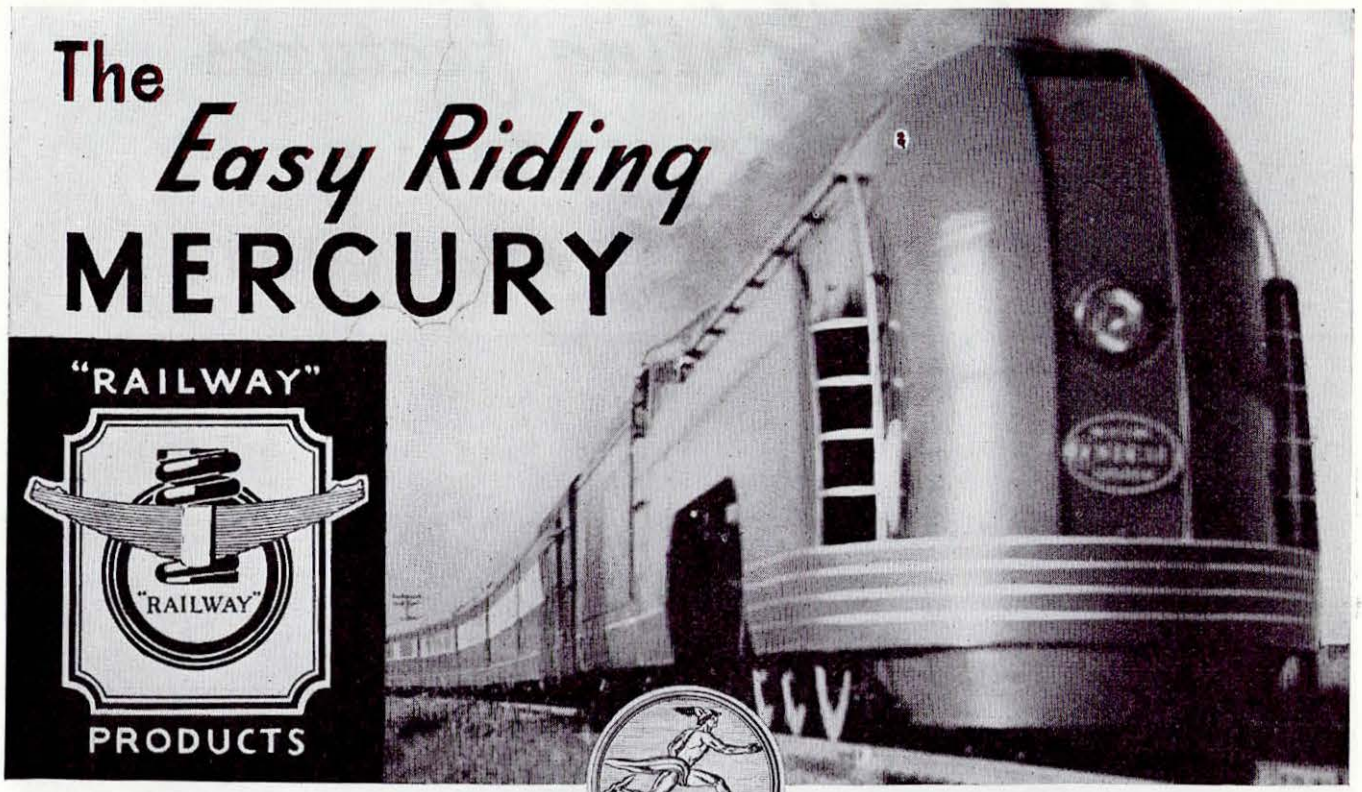
Timken Bearings are used in the engine trucks, trailer trucks and tender trucks of the streamlined locomotive and in all journals of the seven de luxe cars comprising the train. The car bearings are the famous Timken "Quad" Bearings.

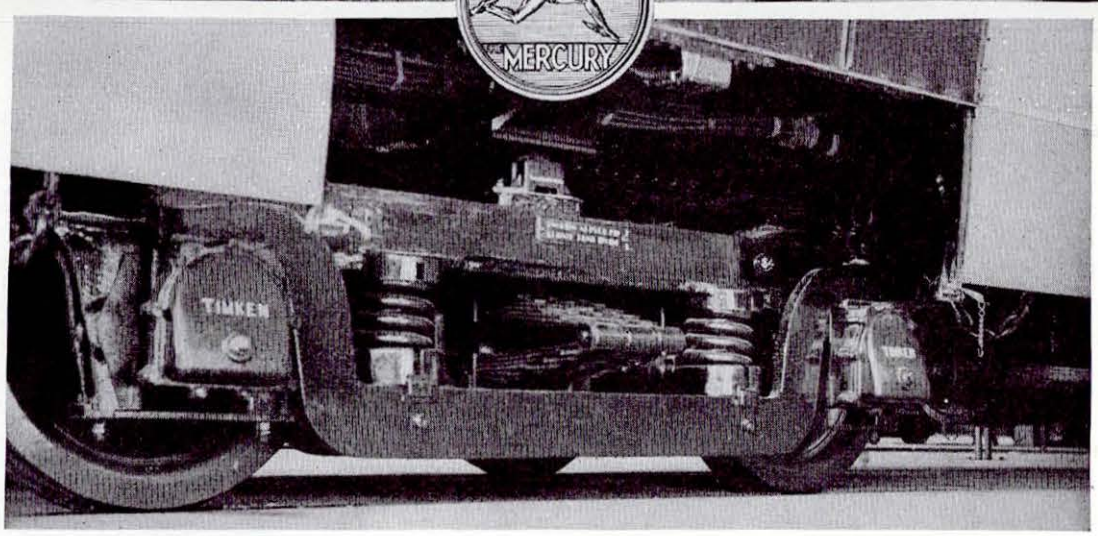
Over 75% of all American streamlined trains and locomotives—in service and under construction—are equipped with Timken Bearings.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN TAPERED ROLLER BEARINGS

The *Easy Riding* MERCURY





IN the construction of this new streamliner, the problem presented to "Railway" Spring experts was to design a truck-spring assembly which would make the "Mercury" the smoothest and easiest riding train possible.

The outstanding riding qualities, so evident on the "Mercury's" very first test run, demonstrated beyond question that the spring problem was solved with unqualified success.

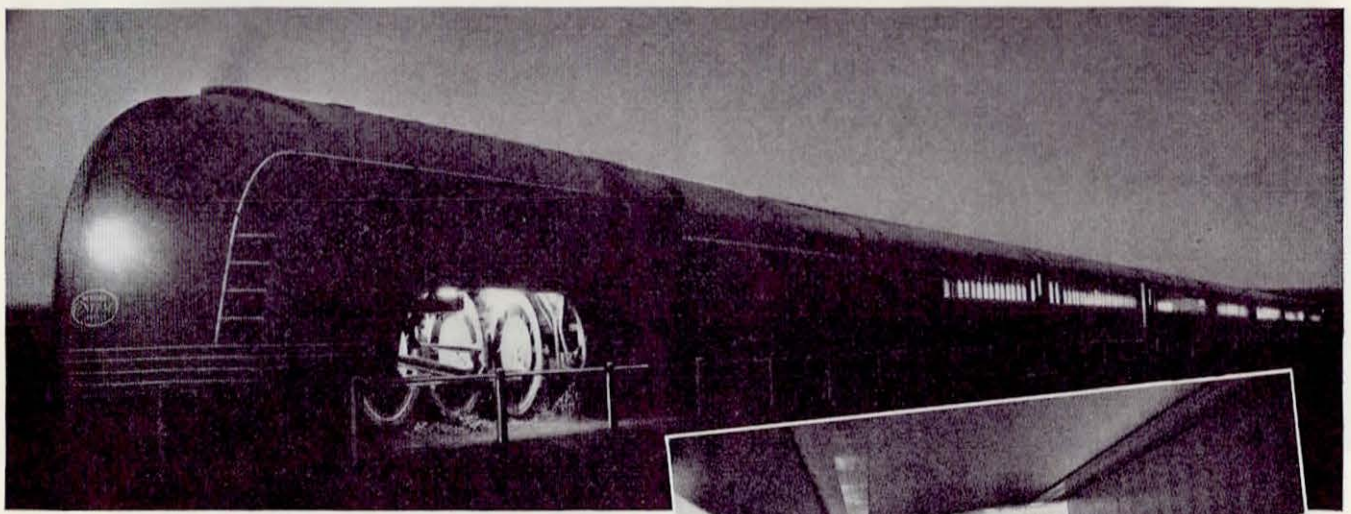
The thoroughly practical manner in which this smoothness of operation was achieved demonstrates again the value of having available an organization specializing in the design and manufacture of springs.

AMERICAN LOCOMOTIVE COMPANY
RAILWAY STEEL SPRING DIVISION
30 CHURCH STREET · NEW YORK · N.Y.

The MERCURY
NEW YORK CENTRAL SYSTEM

Modern lighting features

NEW YORK CENTRAL'S NEW STREAMLINED "MERCURY"



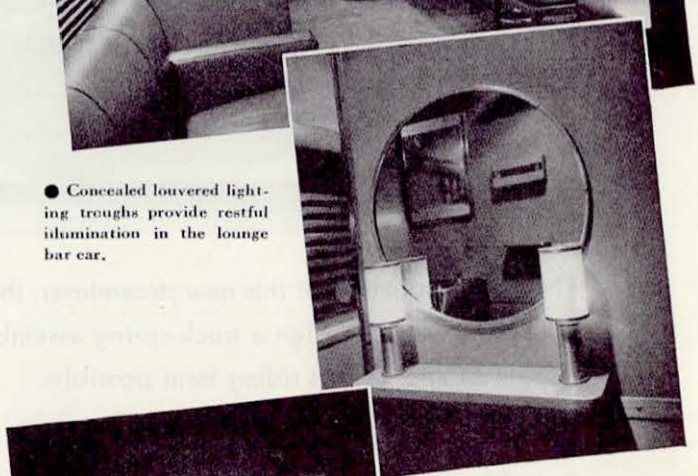
● The seven-car streamlined train MERCURY includes a combination baggage-day coach, one coach, a pantry-kitchen car, dining car, lounge bar car, parlor car, and parlor-observation car. The steam locomotive's wheels are lighted at night by concealed floodlights.

THE MERCURY—New York Central System's new streamlined, air-conditioned train scheduled for fast service between Cleveland and Detroit via Toledo July 15th—presents many innovations in appointments and mechanical features.

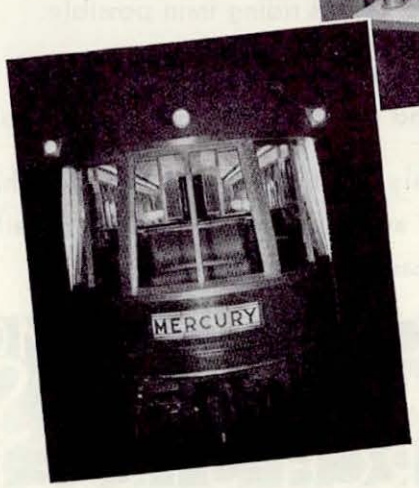
Outstanding is its modern lighting, designed in co-operation with General Electric railway lighting engineers of Nela Park. From locomotive to observation car, the illumination from G.E. MAZDA lamps in each unit of the train was given special consideration. In the cars, every effort was made to insure good light for comfortable reading, and their lighting in foot-candles is two to three times greater than in most trains today.

General Electric also offers your railroad the benefit of its skilled engineering service specializing in all phases of railway lighting. This service is free of charge. For further information, write to General Electric Company, Engineering Department, Nela Park, Cleveland, O.

● Concealed louvered lighting troughs provide restful illumination in the lounge bar car.



● Special lighting contributes to the attractiveness of the washrooms.

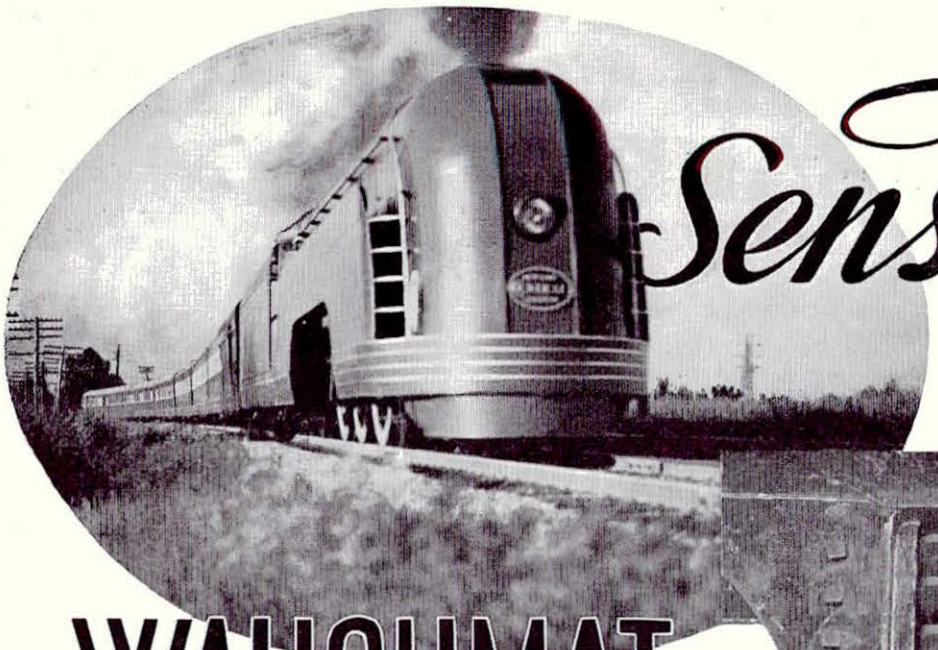


● An electric sign bearing the train's name is built into the parlor-observation car's streamlined, rounded rear end.

GENERAL ELECTRIC
MAZDA LAMPS

The MERCURY

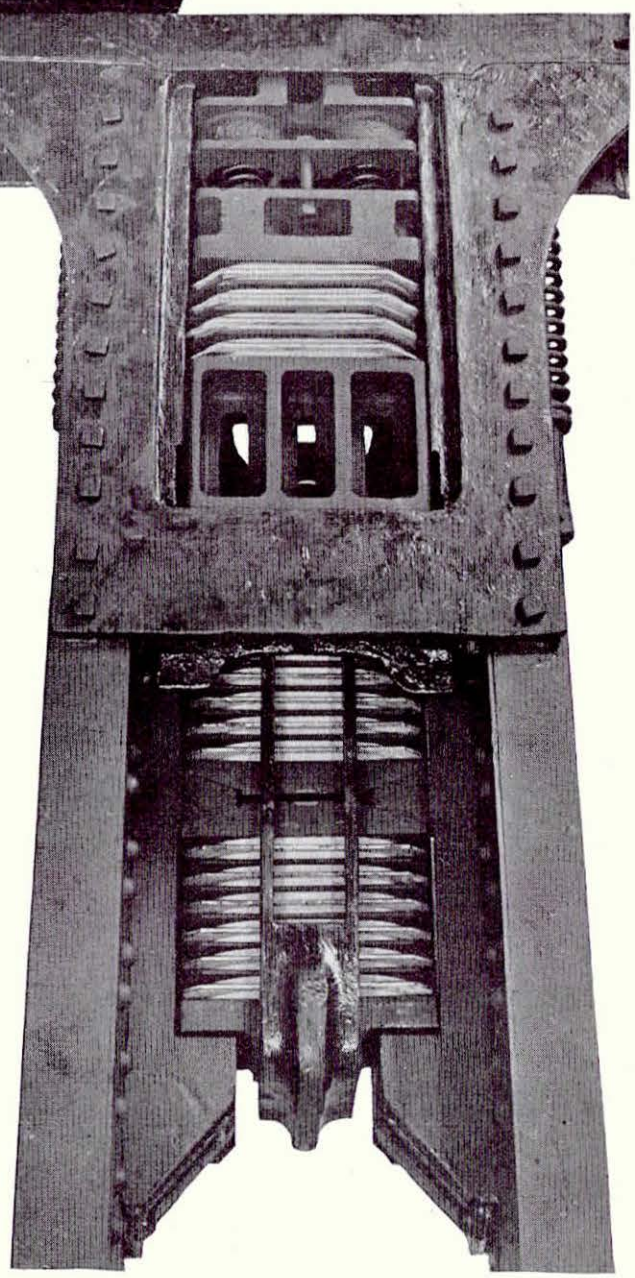
NEW YORK CENTRAL SYSTEM



A Sensation

WAUGHMAT

Twin-Cushions Eliminate Shocks Noise and Vibration



OBSERVERS riding on the NEW YORK CENTRAL'S beautiful new train "THE MERCURY", have been unanimous in their comments on the sensational performance of the latest WAUGHMAT Twin-Cushions which produce a smoothness of operation heretofore unknown in passenger service.

WAUGH EQUIPMENT COMPANY

WAUGH

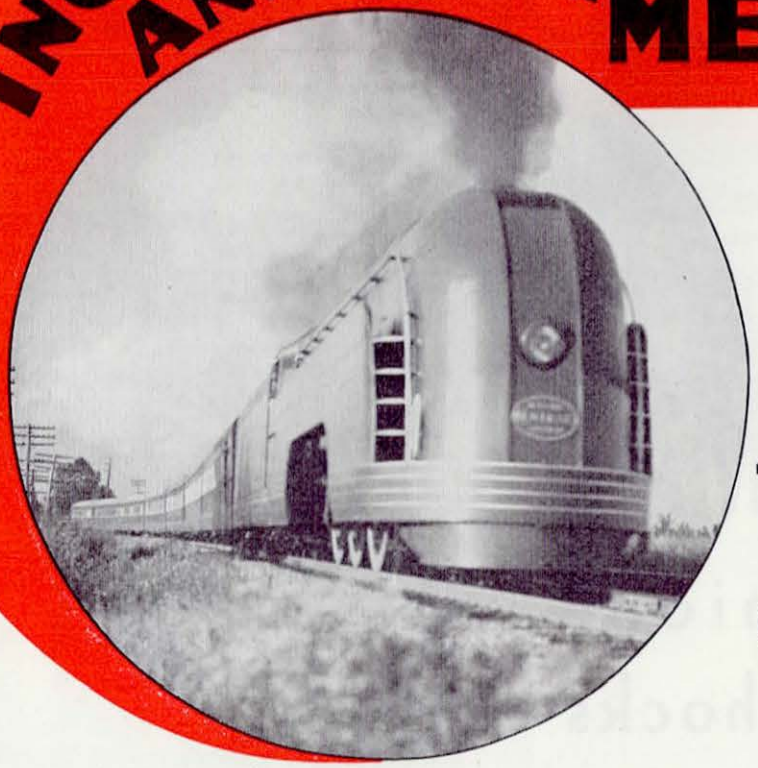
New York Chicago St. Louis

Canadian Waugh Equipment Company, Montreal, Que.

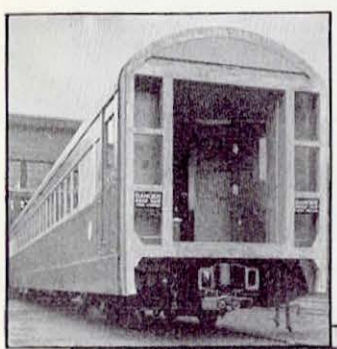
The MERCURY

NEW YORK CENTRAL SYSTEM

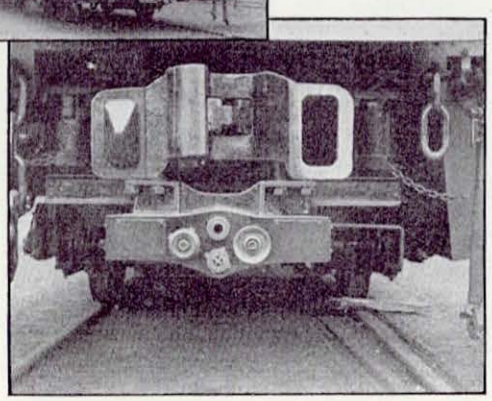
INCREASED COMFORT AND SAFETY for the "MERCURY"



WITH O-B TIGHT-LOCK COUPLERS



This advanced principle of car and train line coupling, provides a rigid connection between cars, making it possible to connect automatically upon impact all air, steam and electrical circuits.



With the "Mercury", that latest addition to an already famous fleet of trains, the New York Central makes a strong bid for a greater percentage of the public's transportation dollar. Carefully engineered from pilot wheels to observation windows, the entire train measures up to exceedingly high standards of comfort, safety and operating economy. Only after it was definitely proved that O-B Tight-Lock Automatic Couplers and Train Line Connectors met these high standards were they chosen for the new train.

With this coupler, which represents an advanced but well tested principle of car coupling, a rigid connection is provided between cars. Undesirable slack between coupler heads is eliminated. There is no jolting, no noise. Comfort and safety of passengers is increased. Safety of trainmen is also increased because the coupling operation is completed automatically upon impact. The train line connector, likewise, increases safety and economy by making it possible to connect automatically all air and steam lines as the couplers engage. Sooner or later you will also be considering new trains, and when you do, remember that it will pay you well to investigate this modern coupling mechanism.

WRITE FOR BOOKLET 612-A

1673-A

OHIO BRASS COMPANY

MANSFIELD OHIO, U. S. A.

Canadian Ohio Brass Co., Ltd. Niagara Falls, Canada

The MERCURY
NEW YORK CENTRAL SYSTEM

AND NOW-

ANOTHER NEW YORK CENTRAL ACHIEVEMENT–

Adding to its already numerous contributions to advanced transportation, the New York Central supplies New Comfort, Time Saving, and Safety, with its

MERCURY

Our congratulations are extended to all who played a part in the production of this modern train which is another contribution to Progress in Transportation.

The New York Air Brake Company

420 Lexington Ave., New York City
PLANT: Watertown, New York

The MERCURY

NEW YORK CENTRAL SYSTEM

STREAMLINED FOR *Speed*

BARCO *Equipped for* SAFETY

The "Mercury" . . . new streamliner on New York Central's Detroit-Cleveland run . . . is another tribute to BARCO performance.

Here's where Mercury depends on BARCO—

—BARCO low water alarm.

—BARCO smoke box blower fittings.

—BARCO rear of tender connections.

—BARCO metallic air and steam connections between engine and tender.

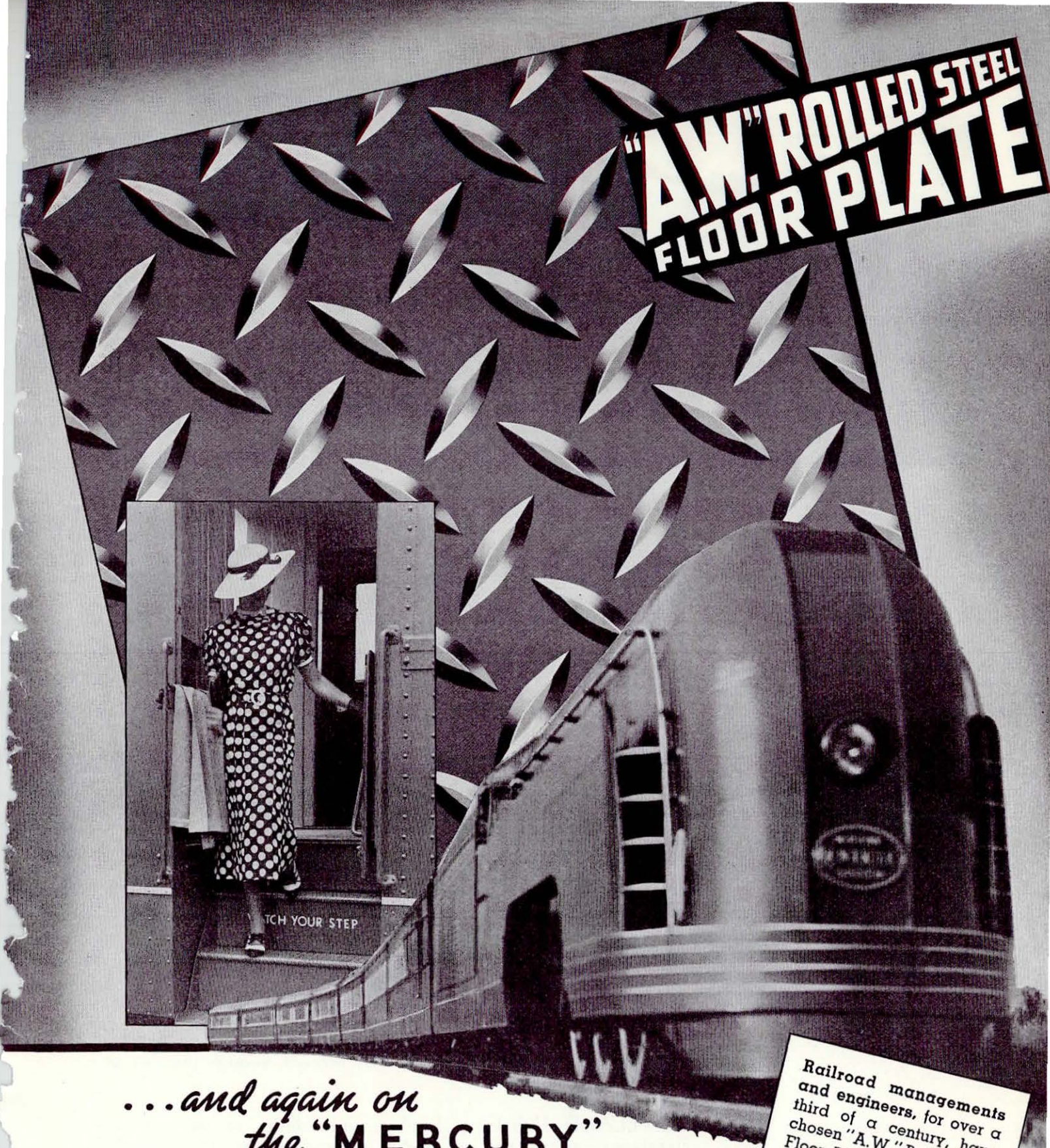
—BARCO air and steam connections on cars.

Surely the choice of BARCO for these important centers in the new streamliners and the use of BARCO equipment by leading railroads depends on more than guesswork. BARCO has won its right to first choice by giving faithful service at lower costs.

BARCO MANUFACTURING CO.
1807 W. Winnemac Ave., Chicago, Ill.

THE HOLDEN CO., Ltd.
In Canada
Montreal — Moncton — Toronto — Winnipeg — Vancouver

BARCO



. . . and again on the "MERCURY"

"A. W." Rolled Steel Floor Plate safeguards crews and passengers against accidents from slipping and loss of balance. Rolled at the Ivy Rock mill of the Alan Wood Steel Company of Conshohocken, Pa., it was installed on all car steps, on the rear of the tender and the cab deck plates of the locomotive. The most modern floor plate found its logical place on the most modern railroad train.

Railroad managements and engineers, for over a third of a century, have chosen "A.W." Rolled Steel Floor Plate for safety and economy on steps, platforms, trap doors, car and cab floors, apron and buffer plates, and running boards.

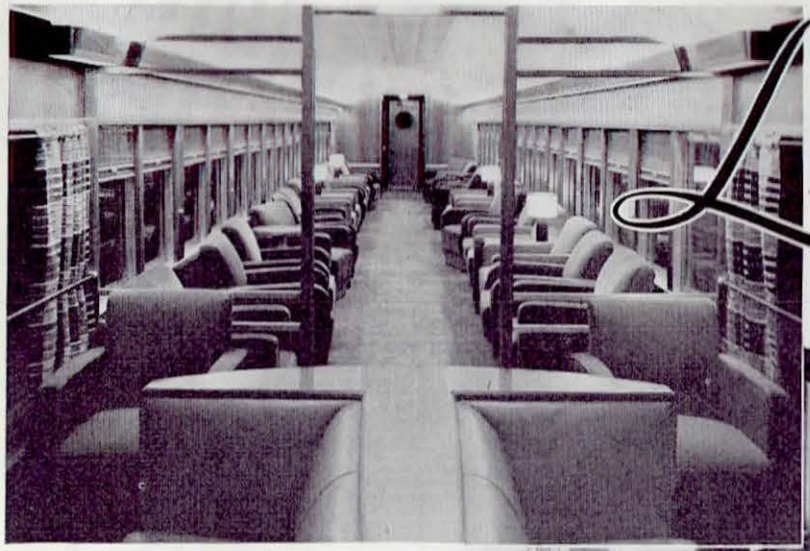
ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

BRANCHES: Philadelphia New York Boston Los Angeles San Francisco Seattle Houston

110 YEARS' IRON- AND STEEL-MAKING EXPERIENCE

The MERCURY
NEW YORK CENTRAL SYSTEM



Leather

—The Rich and Durable Upholstery

LEATHER plays an important part in the appointments of the "MERCURY."

The Cleveland Tanning Company feel proud that their product was selected to help achieve the ultra-modern touch in a train outstanding in its appointments and innovations.

Illustrated above is the end of the observation car, also a typical smoking compartment, showing the rich effects secured through the use of upholstery leather.

CLEVELAND Upholstery Leather, in addition to its hygienic cleanliness—its cool comfort—and its uniformly modern appearance—is unexcelled both in wearing quality and in its ability to withstand the ravages of time—as well as to resist the abuse inherent in prolonged railway service.

CLEVELAND TANNING COMPANY

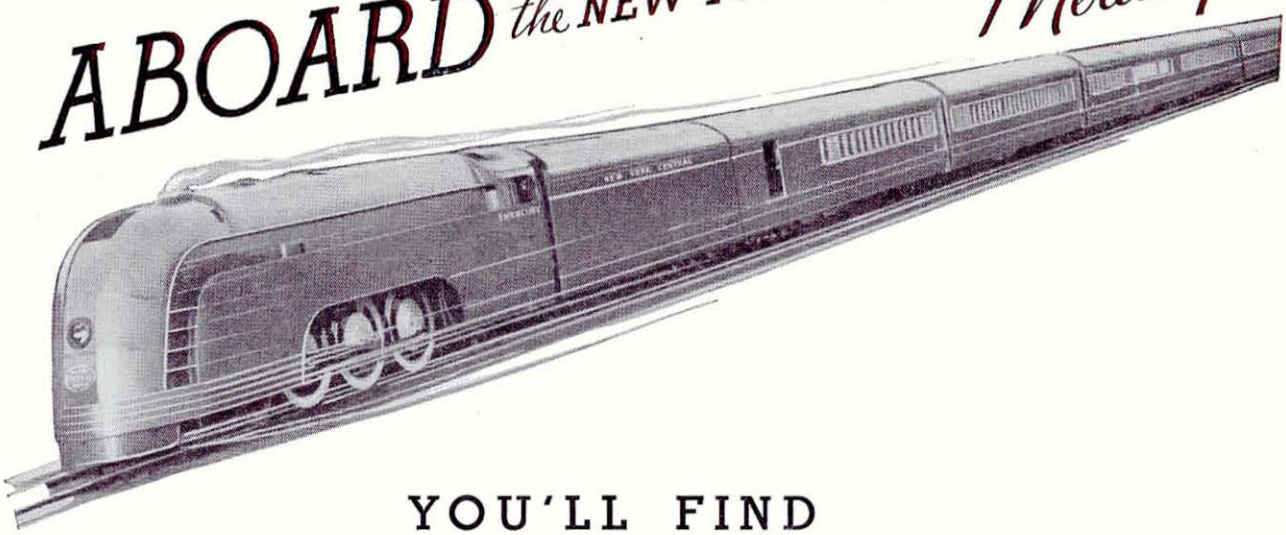
CLEVELAND, OHIO

Railroad Sales Representatives—Midgley & Borrowdale, 8 South Michigan Ave., Chicago, Ill.

The MERCURY

NEW YORK CENTRAL SYSTEM

ABOARD the NEW YORK CENTRAL "Mercury"



YOU'LL FIND
EDWARDS PRODUCTS
—from Locomotive Cab to Observation Parlor

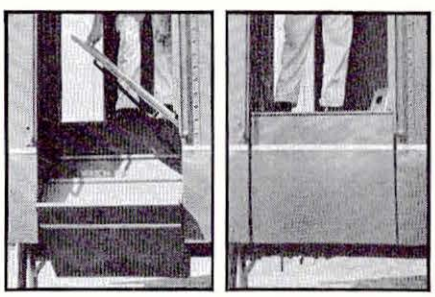
For almost half a century, the "Central" has depended on Edwards products for passenger equipment. And, Edwards engineers have played an important part in the startling design developments of the streamline age.

It is quite natural that Edwards Sash (in the Locomotive Cab as well as the Coaches) and Edwards Vestibule Trap Doors should "ride the Mercury"—for they are serving crack trains on the leading roads from coast to coast.

O. M. EDWARDS COMPANY

New York SYRACUSE, N.Y. Chicago

Canadian Representatives: LYMAN TUBE & SUPPLY CO., LTD.
Montreal and Toronto



EDWARDS SYNCHRONIZED TRAP DOORS with "Retractable" Steps

Automatically sychronized operation—maximum passenger safety when leaving or boarding trains—"streamlined" appearance that is geared to modern coach design—these are the reasons why Edwards Trap Doors have been selected for the "Mercury" and other "trains of tomorrow."

EDWARDS SASH

SERVES PASSENGER TRANSPORTATION EQUIPMENT *on* RAIL, HIGHWAY *and* SEA

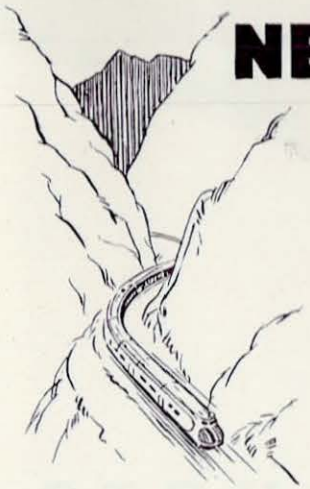
FOR THE STREAMLINE AGE

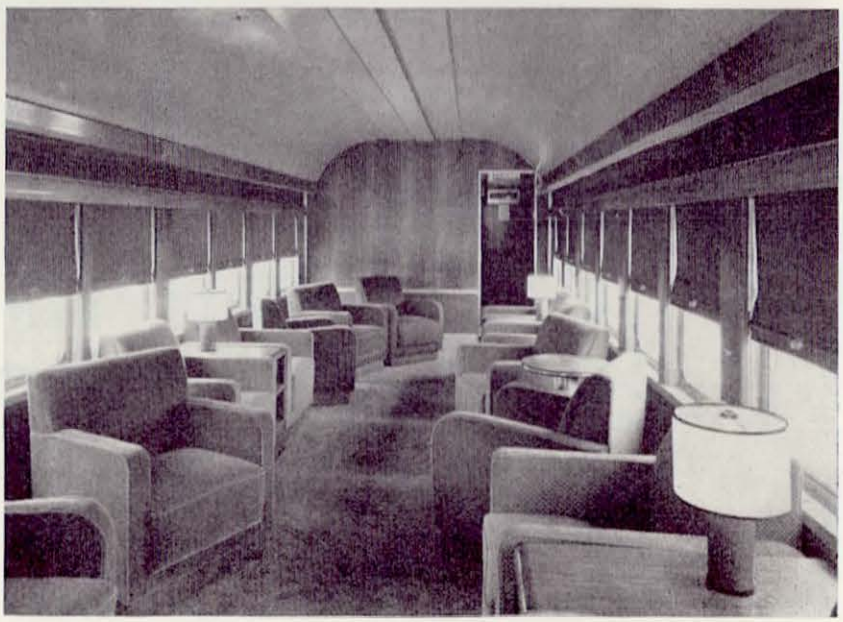
The MERCURY

NEW YORK CENTRAL SYSTEM

FORMICA ON "THE MERCURY"

NEW YORK CENTRAL FLYER



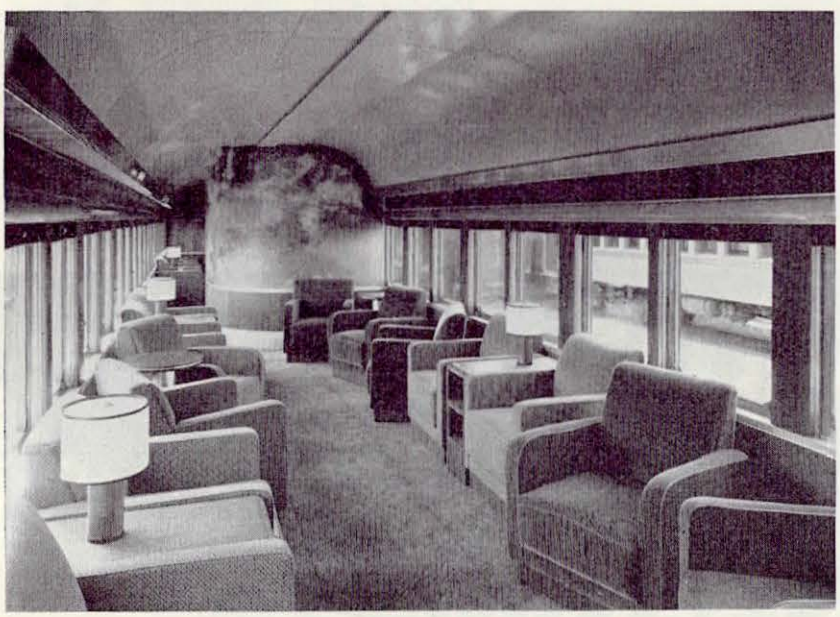


FORMICA was again used for several purposes in the building of the New York Central Detroit-Cleveland Flyer, "The Mercury".

There were Formica table tops, Formica shelving, and Formica translucent lamp shades in many of the splendid cars on this train.

The material is also being used by railroads for sliding panels in Pullman berths, cover linings for hopper seats, window capping, and in terminals for doors, counter tops, and wainscot.

Formica is available in 50 colors; metal may be inlaid in the surface to produce decoration, or one color may be inlaid on another. The table tops do not blister from cigarettes, or spot with liquids. They are not brittle or easily breakable, and they are relatively light in weight.



Let us tell you all the facts.

THE FORMICA INSULATION CO.

4641 SPRING GROVE AVE.

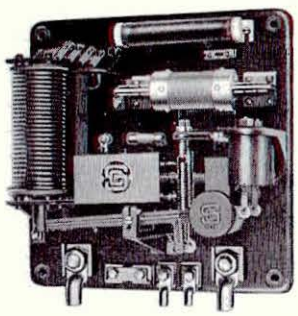
CINCINNATI, O.

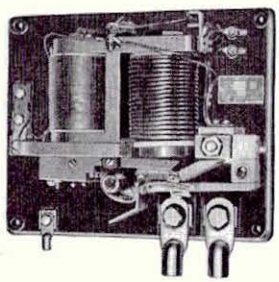
FORMICA

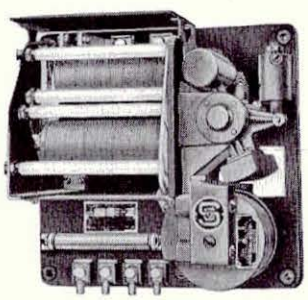
FOR MANY PURPOSES

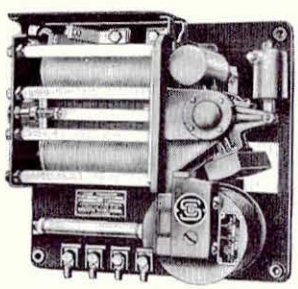
The MERCURY

NEW YORK CENTRAL SYSTEM









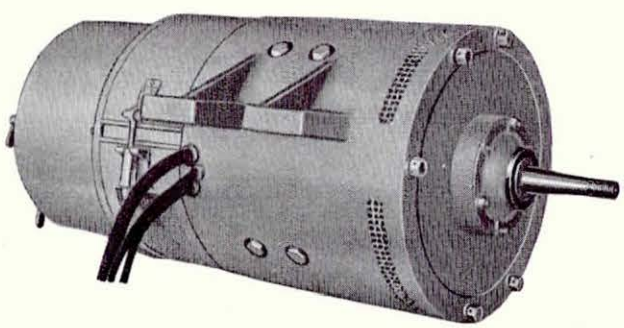
SUCCESSFUL OPERATION

The power demand of the improved services installed on modern railway cars makes the use of an efficient and reliable power plant imperative.

Safety Axle Generator Equipment using Safety Carbon Pile Regulators and Relays assures reliable, economical control with minimum maintenance expense.

The efficiency of this equipment is a fact of long standing to railroad men.

Its use adds greatly to successful passenger car operation.

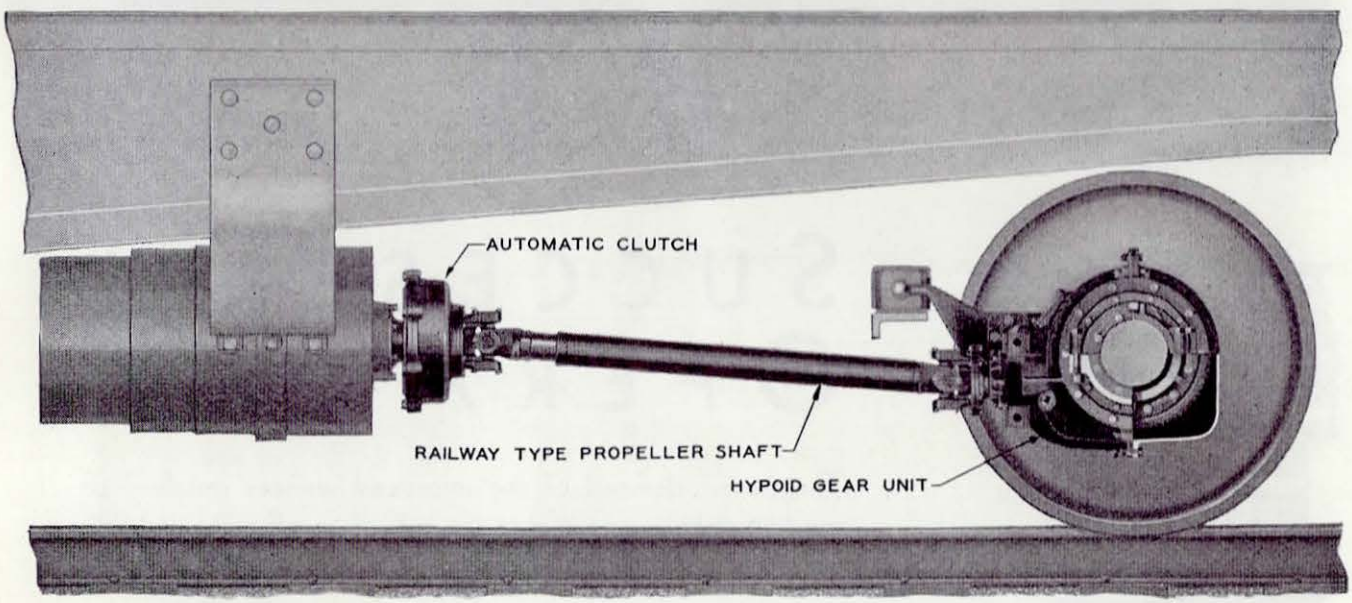


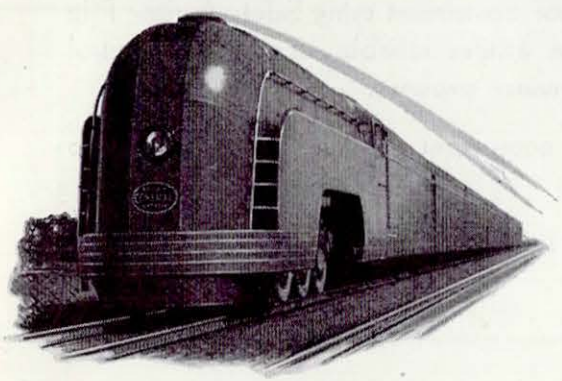
THE SAFETY CAR HEATING & LIGHTING CO.

NEW YORK
PHILADELPHIA
CHICAGO
PITTSBURGH
ST. LOUIS
SAN FRANCISCO
BOSTON
MONTREAL

The MERCURY
NEW YORK CENTRAL SYSTEM

Spicer Positive Railway Generator Drive IN THE "MERCURY"





The "Mercury"—New York Central's modern, fully streamlined train—operating on a daily round trip, mile-a-minute schedule between Cleveland and Detroit, via Toledo.

Close-up view of the Spicer Positive Railway Generator Drive on the new "Mercury." This drive consists of a very simple application of long-lived bevel gear and pinion mounted on the standard axle. The drive from the gears is positive and constant through Spicer Needle Bearing Universal Joints and Propeller Shaft to the Spicer Automatic Clutch mounted between the generator and the propeller shaft. This automatic clutch completely absorbs all shocks and disconnects the drive line in case of excessive overload, and also completely disconnects the generator drive at speeds below 5 miles per hour, eliminating shock loads when cars are being shunted. It also automatically permits motoring of generator for electrical inspection, and driving of generator by standby motor.

●

● The last word in modern, up-to-date rail transportation, the "Mercury"—New York Central's first fully streamlined train—is equipped with Spicer Positive Railway Generator Drive for its lighting and air-conditioning equipment. The "Mercury" is air-conditioned throughout for year-round operation . . . Spicer is proud of the recognition accorded the merit of its Railway Generator Drive by the New York Central, in installing it in such an outstanding new train as the "Mercury." The Spicer Positive Railway Generator Drive is backed by 30 years' experience in building similar equipment of the highest quality. You are invited to write for descriptive literature.

Spicer

MANUFACTURING CORPORATION • TOLEDO • OHIO

The MERCURY
NEW YORK CENTRAL SYSTEM

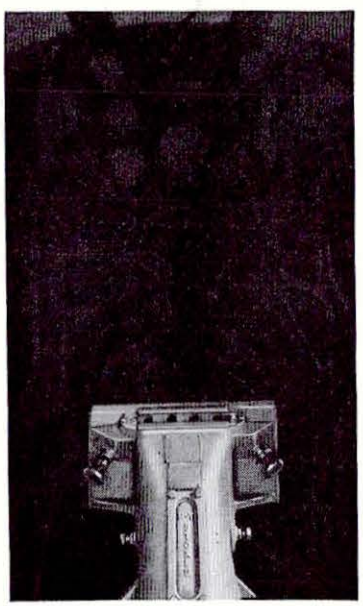
STOKERED BY STANDARD

Modern design and high speed transportation are reviving railroad passenger business.

But back of these new standards of railroading must be adequate mechanical performance. Speed demands high sustained boiler horsepower which in turn calls for stoker firing.

On the "Mercury" of the New York Central an "H-T" Standard Stoker fires coal economically and dependably. Its flexibility accommodates any operating demands. Its efficiency contributes to low cost operation.

Not only on spectacular jobs like this but everywhere locomotives are fired, Standard Stokers are performing economically and dependably.



THE STANDARD STOKER COMPANY, INC.
NEW YORK • CHICAGO • ERIE

The MERCURY
NEW YORK CENTRAL SYSTEM

A Watched Cup That Didn't Spill

An observer riding on a test run of the "Mercury," and marveling at the smooth riding qualities of this revolutionary train, decided to conduct a little test of his own. Filling a paper drinking cup with water, he balanced it on a rear window of the observation car.

Mile after mile . . . smoothly . . . swiftly . . . the "Mercury" sped on its way . . . without a bounce . . . without a jerk. Not a drop of water spilled over the brim of the cup.

Playing no small part in the exceptional riding qualities of the "Mercury" are the Vanadium Steel Springs on the cars — Chromium-Vanadium Leaf Springs and Silicon-Vanadium Coil Springs.

Behind the selection of Vanadium Steel Springs for the "Mercury" are years of railroad history — and dependable, low maintenance spring performance. Coil Springs of Silicon-Vanadium Steel and Leaf Springs of Chromium-Vanadium Steel improve riding qualities and minimize spring failures. Frequently, they permit considerable reduction in spring size and weight.

If you are interested in dependable, money-saving springs, the Metallurgical Engineers of the Vanadium Corporation of America will be glad to discuss your spring problems.

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Leading engine truck axles, main rods, side rods and main crankpins are Carbon-Vanadium Steel, normalized and tempered.

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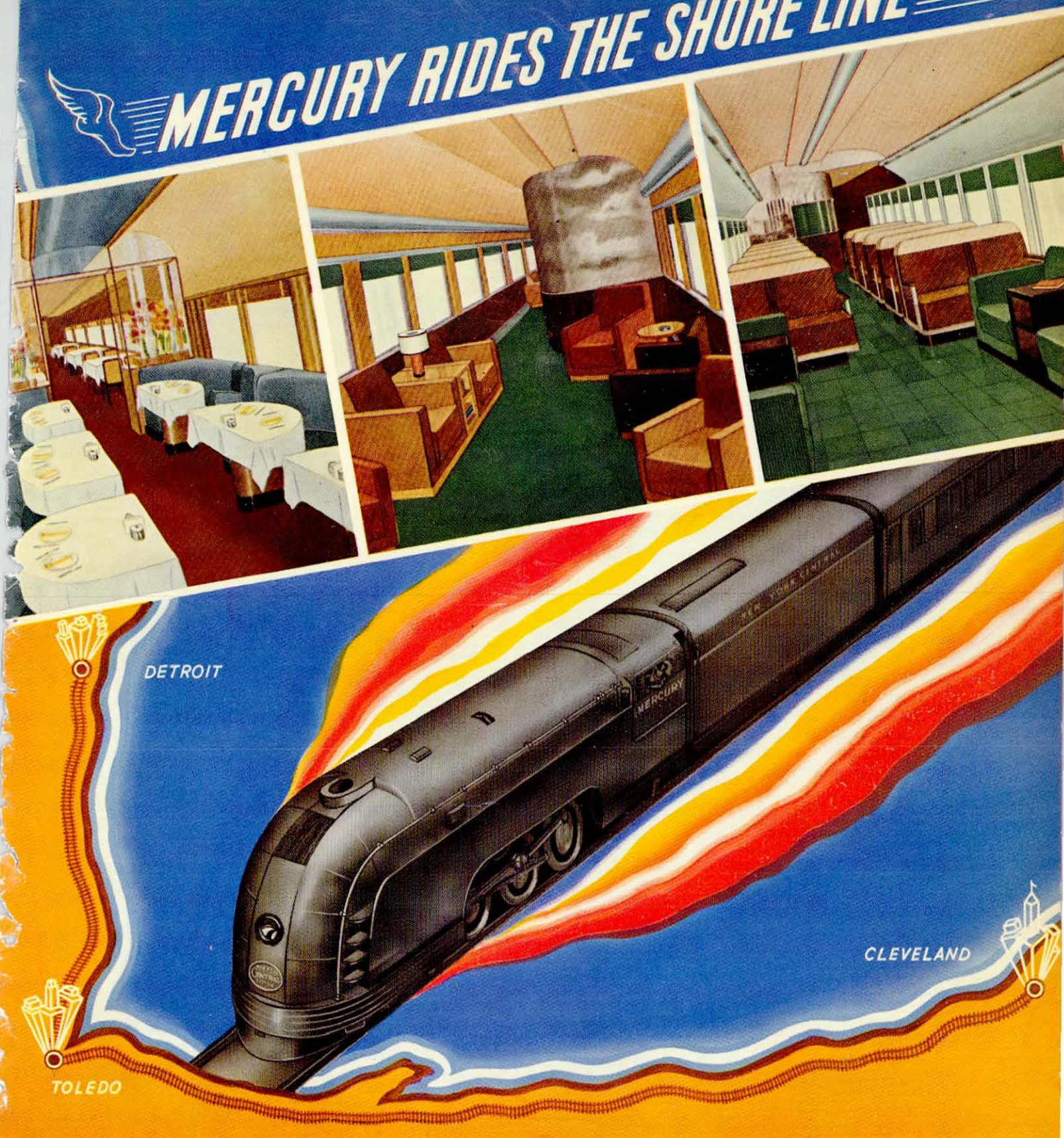
FERRO ALLOYS
of vanadium, silicon, chromium, and titanium, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

FOR STRENGTH · TOUGHNESS · DURABILITY

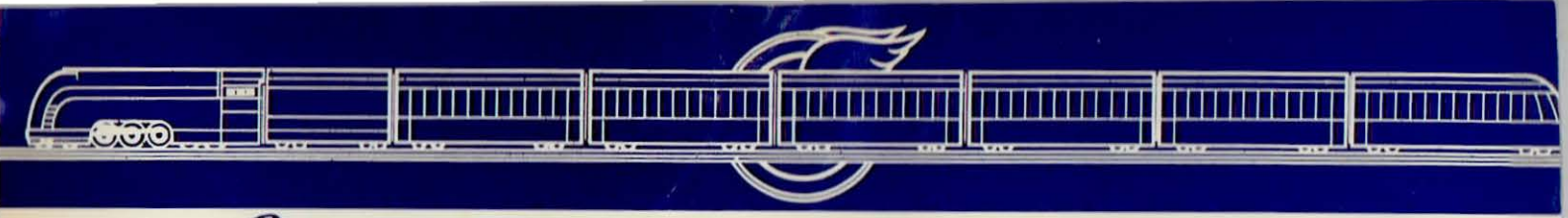
MERCURY RIDES THE SHORE LINE



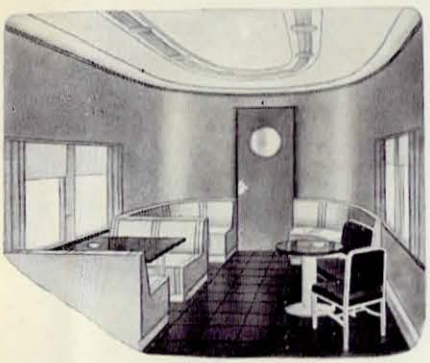
New York Central's Mercury is SHERWIN-WILLIAMS throughout

Sherwin-Williams railway finishes are used on the new "Mercury" . . . inside and out.

From the time the Mercury was just a smart idea in the minds of New York Central officials until the completed train was streaking over the rails, Sherwin-Williams engineers were "on the job". They developed the new colors required by Designer Henry Dreyfuss; they worked hand-in-hand with the New York Central's motive power and rolling stock engineers. The exterior of the train is finished in S-W Opex Railway Lacquer. The interiors of the cars are finished with S-W Kem Railway Enamels. Sherwin-Williams engineers and designers will gladly work with you, to give your product beauty and protection. Write to The Sherwin-Williams Co., Cleveland Ohio, and all principal cities.



Luxury rides the rails



STREAMLINE COMFORT

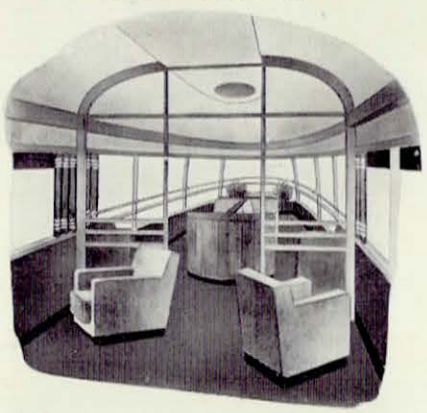
Gone are the faded plush seats of yesteryear. Gone, too, the red mahogany and green enamel.

The Mercury is a distinctive, new and different train. Color, speed and comfort tell its story. The seven unit train was designed throughout by Henry Dreyfuss in conjunction with the engineering department of the N. Y. C., even to the china, glassware and silver. No two car interiors are alike in form, design or color. What a pleasant ride it will be . . . 170 minutes from Detroit to Cleveland!

The train's designer really put color to *work*, with a distinctive scheme for the entire train. On the exterior, color ties the 7-car unit together. On the interior, color has continuity, yet avoids through varying combinations, the monotony which comes from repetition.

Throughout all cars, rich tones of brown and rust have been contrasted with varied light shades of tan, and gay greens and blues. And the aluminum trim used throughout adds a modern flash and accent.

Paint, fabrics and metals harmonize into an attractive color scheme. The ceiling of the coach smoking room shown above is in light Buckskin Tan S-W Railway Enamel, developed by Sherwin-Williams to meet the special requirements. The walls are in an attractive Metallic Blue in which a small amount of aluminum bronze powder has been mixed to give a flecked silver effect. The leather of the loose chairs is essentially the same color. Deep brown rubber tile covers the floor, and the curtains are of blue cloth with white woven accent.



SPEED AND SUNSHINE

The landscape between Cleveland and Detroit is charming indeed. Lake Erie's beaches—rolling meadows—tall trees and green fields. Windows are *wide* expanses of glass—the Mercury's passengers easily enjoy all the beauty of the country-side.

The Parlor and Observation car, last unit in the train, has a streamlined rear end and large areas of glass. Its ceiling, and that of the pullman car, is in light tan S-W Railway Enamel, selected for beauty and durability. Designer Dreyfuss selected certain wall and ceiling colors to give added width and depth to the cars. Color does many things well.

EATING IS A PLEASURE

Eat the finest food and watch the country go by!

The Mercury's diner is entirely unique and new in plan. It is divided into three dining sections, and waiting lounge, by three plate glass partitions, and the kitchen is in a separate car.

In the center dining section are attractive side-by-side tables, with the more conventional seating arrangement in the two end diner sections. The ceiling is S-W Kem Railway Enamel in a light tan shade. So are the venetian blinds. The passageways at the ends of the car are finished in chocolate brown S-W Railway Enamel, for contrast value and depth. The carpet is red brown, and the walls are finished in walnut Flexwood. Built-in center seats are in green blue leather; the loose chairs are in tan.

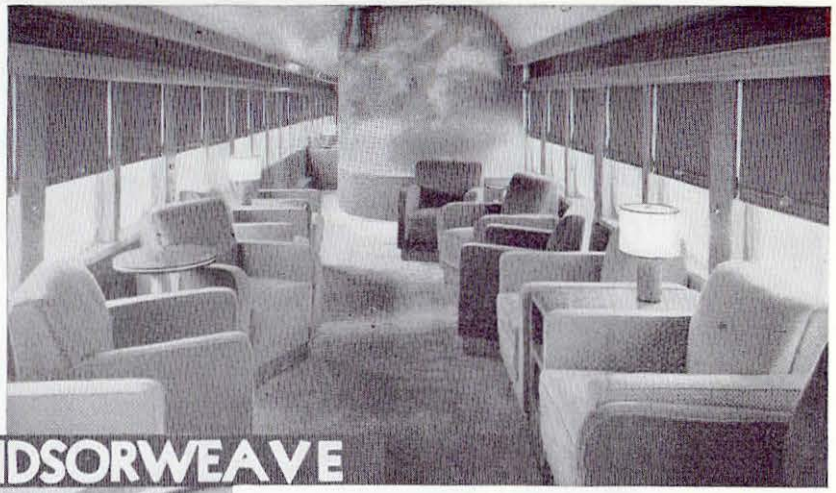
Sherwin-Williams is proud of the part its engineers and decorators played over many months in building The Mercury, and they will gladly cooperate with you in specifying and, if necessary, formulating new finishes for special purposes. Let the world's greatest paint and research laboratories put their experience and skill to work for you.

SEE THE SHERWIN-WILLIAMS PAINT ENGINEER

SHERWIN-WILLIAMS PAINTS

The MERCURY
NEW YORK CENTRAL SYSTEM

On the
New York Central's
MERCURY



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THE Mercury—unique in the transportation field—a thoroughly modern streamlined train — just as comfortable and luxurious as a private club!

Custom built from end to end, with specially designed furniture throughout —the interior of this outstanding streamliner has been rendered particularly effective by the use of carefully chosen upholstery fabrics of exquisite color and textural composition.

WINDSORWEAVE, manufactured by Wm. Wiese & Co., Inc. is used in the observation car and in the parlor car of the Mercury. This material is constructed of the finest worsted yarns—it is very durable, yet pliable so as to tailor easily and beautifully.

WINDSORWEAVE presents a comfortable, smooth and cool riding surface. The passenger can leave his seat or shift his position without difficulty or discomfort—this material does not cling to the clothing.

WINDSORWEAVE insures comfort, beauty and enduring economy.

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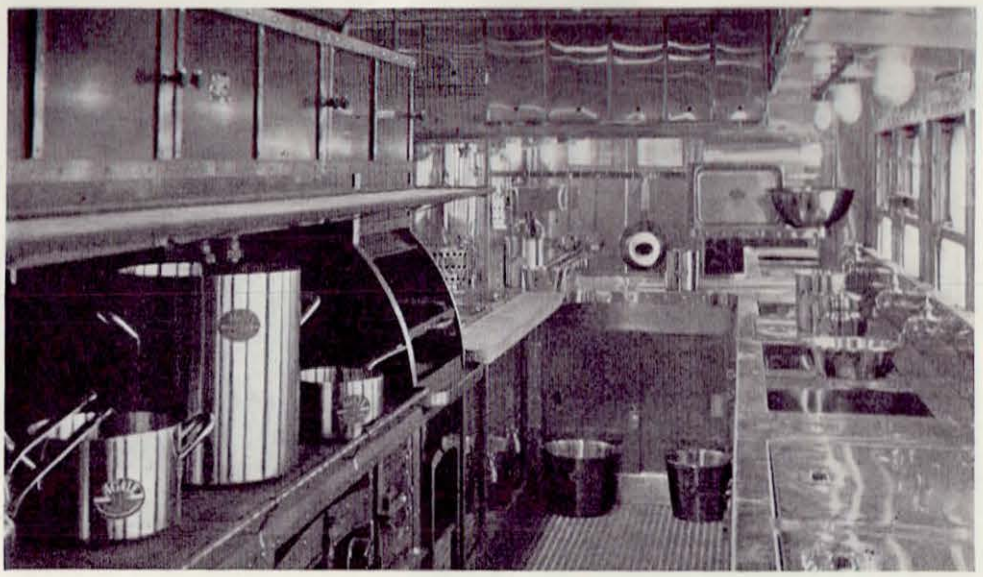

THE KITCHEN of the New York Central's "MERCURY", newest streamline train, is completely equipped with CRUSADER and AGATE STAINLESS Pots and Pans. The finest ware obtainable has been chosen for the pride of the New York Central's fleet.

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NATHAN EQUIPMENT

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—the doors with electric eyes.

—they open when they see you coming.

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New Britain, Conn.

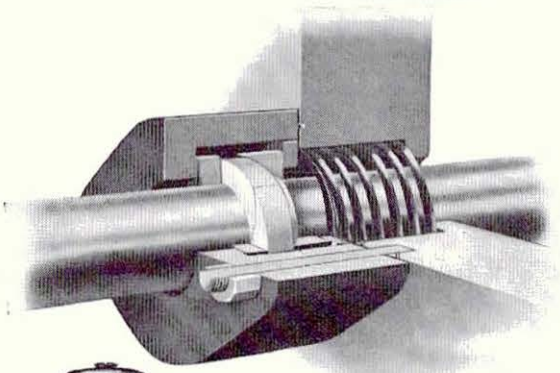
S.W.

The MERCURY

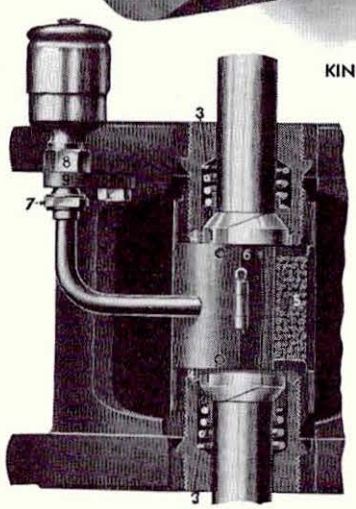
NEW YORK CENTRAL SYSTEM

KING Metallic PACKING

On the Mercury's Piston Rods — Valve Stems and Air Pump Rods . . .



KING Valve Stem Packing



KING Air Pump Packing

DEPENDABLE, pressure tight, long wearing packing is a vital factor on the "Mercury" which must make a high speed, round trip daily between Cleveland and Detroit.

Satisfactory performance of KING Metallic PACKING on thousands of other locomotives on the New York Central System made the selection a very simple task.

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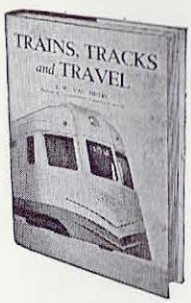

The new edition of this popular book on railroads describes latest practice. There is a complete new chapter on streamlined trains and additions to others covering the new developments in air brakes, air conditioning of passenger cars and in high-speed Diesel and electric locomotives. Among the numerous new illustrations are shown the new streamlined trains. This is an excellent book for a boy who wants to know more about railroads and for the average reader.

Contents

Our Steam Railroads—The Railroad Track—The Steam Locomotive—Electric Locomotives; Gasoline and Oil Motors—Freight Cars—Passenger Train Cars—Tomorrow's Trains Become Today's—Passenger Stations and Terminals—The Operation of Trains.

1936. 4th. 312 pages, 276 illus., 7 x 9½ in., cloth, $3.00

Analysis of Railroad Operations

By J. L. WHITE

Formerly Assistant Comptroller, United States Railroad Administration; Director, Section of Transportation Service—Federal Co-ordinator of Transportation

Without going into the details of accounting procedure, Mr. White clearly explains the accepted method of analyzing and interpreting railroad statistical data. He describes how the figures produced in accounting departments should be used in the study of railroad operating results; how these figures reflect the various activities of the railroad and its efficient or inefficient operation as a whole or in any of its departments.

Classifications of the Interstate Commerce Commission are shown in full and frequent references are made to them in the main text.

1925. 391 pages, forms, index, work sheet, and the Jan. 1, 1935, order of the I. C. C., 6 x 9 inches, cloth. $4.00

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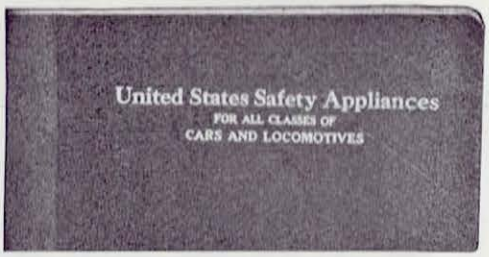


United States Safety Appliances

(A. A. R. Edition)

The 14th edition of this book contains all the new laws, I. C. C. rulings and A. A. R. specifications since the last edition in 1928. More than 250,000 of these books have been sold.

1935. 121 pages, 49 drawings, 7½ x 3¾, imitation leather, $1.00

When Railroads Were New

By CHARLES FREDERICK CARTER

A fascinating human interest story of the early American and Canadian railroads and of the men who built and ran them. The author, an old railroad man, tells of the beginnings of the Erie, the Pennsylvania, the Baltimore and Ohio, the New York Central, the first Pacific railroad, the Santa Fe, the Rio Grande, the Canadian Pacific and other lines. It is illustrated with reproduction of wood cuts of early locomotives and railroad scenes.

1926. 4th (Centenary). 338 pages, 17 illustrations, 6 x 9 inches, cloth. $2.50

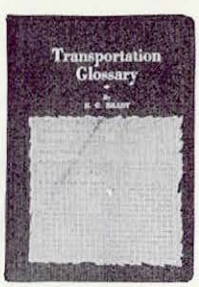
Who's Who in Railroading

The 9th Edition of what was formerly the "Biographical Directory of Railway Officials of America" is based upon a complete resurvey of the field by means of original questionnaires. Biographical sketches of some 4,000 railroad officials, equipment manufacturers, economists, members of regulatory commissions and others whose work is directly connected with the railroad industry of North America are presented. The descriptions of these leaders of the rail industry include personal information, such as their family connections and social, religious and political affiliations, as well as a complete outline of their professional careers.

1930. 579 pages, 6 x 9 x 1⅝ inches, cloth. $3.00

Transportation Glossary

By H. G. BRADY



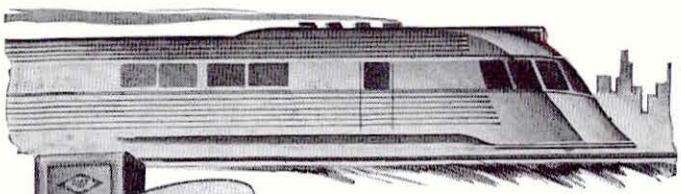
Technical and semi-technical terms, phrases and expressions in more common use in railway, highway, air and marine transportation, and in port traffic are concisely defined in this handy reference book. Ordinary dictionaries, thesauri and law book sources furnish little information on transportation terms and this book fills a long felt need. It is printed in large clear type and cross references facilitate quick tracing of desired information.

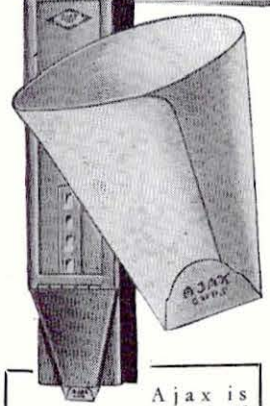
1929. 119 pages, 5 x 7 inches, flexible. $1.75

The MERCURY

NEW YORK CENTRAL SYSTEM

MODERN





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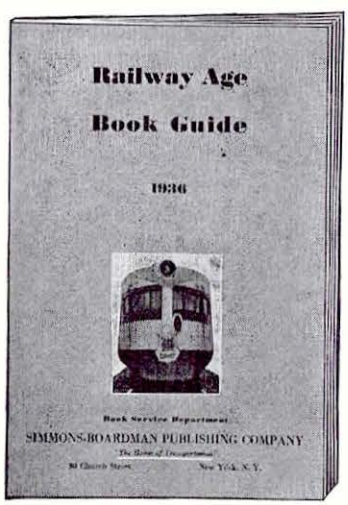
Railway Age Book Guide



Books of interest to readers of "Railway Age" that have been published during the past decade and are still in print are described in this handy catalog. They are classified under general subject headings and arranged in chronological order. There is a title index to facilitate quick reference.

SUBJECT INDEX

Accounting — Administration — Consolidation — Co-ordination — Economics — Finance — General — History — Law — Officers — Personnel — Rates — Regulation — Statistics — Traffic Management — Valuation.

1936. 28 pages, 6 x 9 inches, paper cover.

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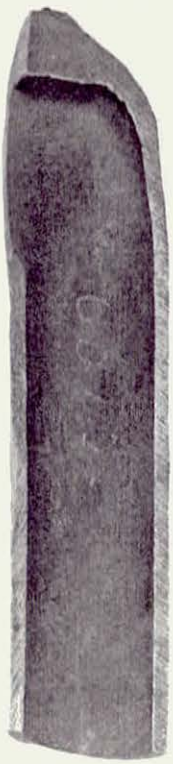
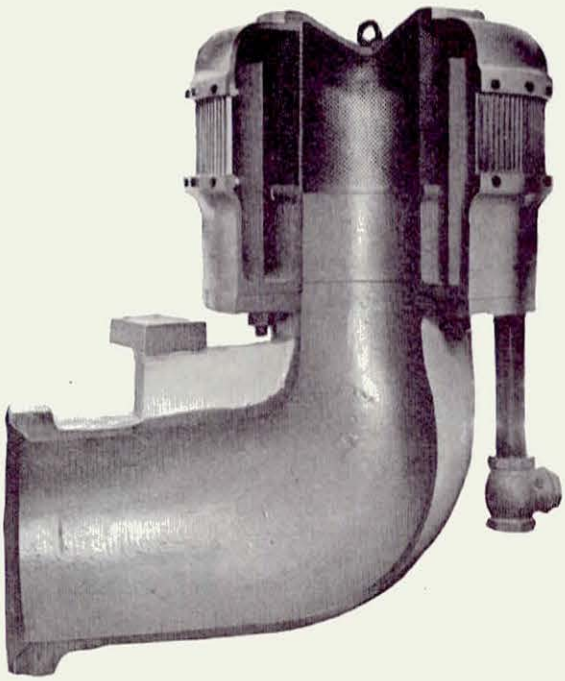
Condition of unit return bend — locomotive not equipped with separator after 200,000 miles.



Condition of unit return bend — locomotive equipped with D. S. V. Separator after 200,000 miles.



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Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

Vol. 101 July 11, 1936 No. 2

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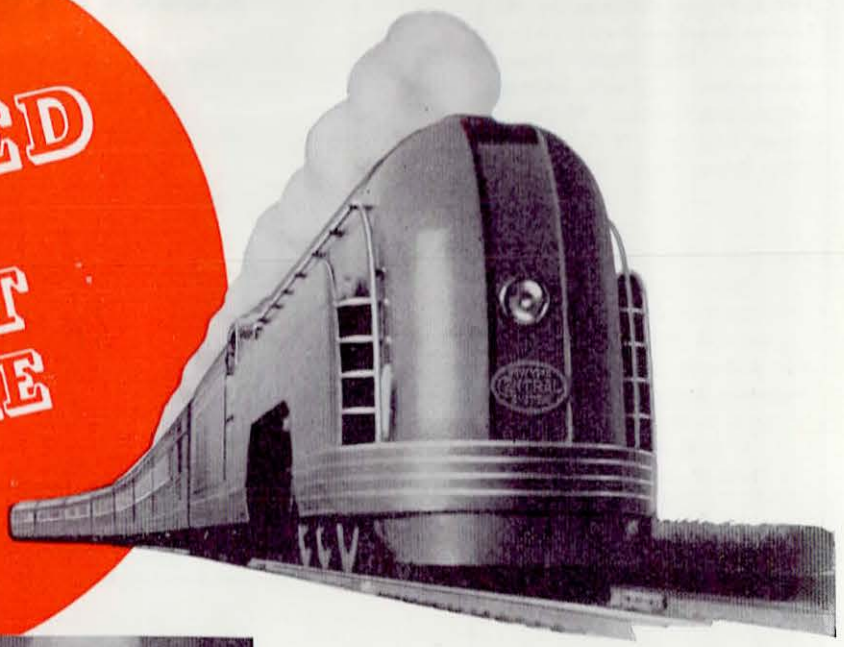
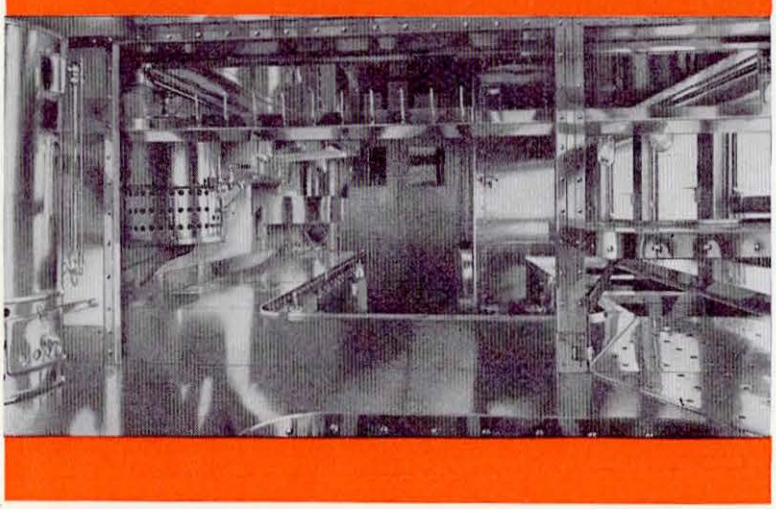
The MERCURY

NEW YORK CENTRAL SYSTEM

EQUIPPED FOR A BRIGHT FUTURE





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Step inside the kitchen and pantry car of the new New York Central Mercury, and see a kitchen and pantry which represents the last word in culinary science. The equipment all sparkles like polished silver . . . for it is made from ENDURO—Republic's perfected stainless steel. Years from today, should you again visit this car, there will be no change in the appearance of the equipment, for ENDURO is permanently immune to blemish or attack from foods, fruit juices, kitchen fumes or atmospheric attack. A quick wiping with a damp cloth quickly removes all deposits from its hard, smooth surface . . . keeping the metal forever lustrous, and absolutely sanitary for every kitchen use. Thus, with stain-proof ENDURO, management provides the equipment essential for an excellent cuisine; and management profits through a marked reduction in maintenance, and the absence of equipment replacement costs. Write Department RA for full details on stainless ENDURO.

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RAILWAY AGE

Rebuilding the Railroad Industry

Railroad managements are engaged in rebuilding an industry. The discontinuance of the office of Federal Co-ordinator of Transportation has increased their opportunity to rebuild it in the ways that they think best. It is nevertheless encouraging that the Association of American Railroads has announced its intention to take advantage in every manner practicable of the information and suggestions developed by the co-ordinator and his staff. The statistics of railway buying in the first six months of 1936 published in last week's issue of the *Railway Age* are heartening evidence of the improvement in the railway situation occurring and of the determination of the managements to rehabilitate and improve the physical properties as rapidly as their financial resources will permit. The decision of a Federal Court holding unconstitutional the act to tax the railways to help provide retirement pensions probably foreshadows the decision of the Supreme Court, and indicates that another recent Congress-made obstacle to an increase of net operating income will be removed.

The essential means of rebuilding the industry is the securing of an adequate increase of net operating income. To paraphrase a statement of Lincoln's about public sentiment, without net operating income nothing is possible; with net operating income everything is possible. The railroad problem can perhaps be most clearly envisaged by considering the difficulties that must be overcome in order adequately to increase the net operating income of the *industry*. The approach of the co-ordinator to the problem at least had the advantage that it was an approach from the standpoint of the *industry*.

A Survey and Plan Needed

There is needed a realistic and comprehensive survey of all the things that need to be done to rebuild the earning capacity of the industry, and an equally realistic and comprehensive long-range plan based on the conclusions of this survey for getting the necessary things done. The making of this survey and plan, and the exertion of influence on individual railroads to promote its execution, are obviously functions of the Association of American Railroads. No doubt any survey and plan made would be required by changing conditions to be modified more or less from time to time; but the railroad industry as a whole should set definite objectives of accomplishment for itself and adopt definite means for attaining them. Otherwise, why have a national organization with large nominal authority and important nominal functions?

First, the total traffic available for all carriers must be increased. Its increase, especially of freight traffic, can be caused in only small measure by railway managements, because its volume is principally determined by the amount of production and construction done by other industries. One of the most common of all fallacious statements is that freight traffic could and should be increased by a general reduction of railway rates. Railway freight charges probably average less than 10 per cent of the value of all the commodities transported. If the value of a commodity is $100, and the freight rate on it is $10, a 10 per cent reduction in the rate on it could not alone reduce its selling price more than 1 per cent. Obviously, this would not stimulate the demand for and production of the commodity very much. A general reduction of 10 per cent in freight rates accompanied by a 10 per cent reduction in prices of commodities might tell a different story; but a general reduction of freight rates sufficient by itself perceptibly to stimulate traffic would have to be so large that it would complete the bankruptcy of the railroad industry.

Traffic Dependent on Production

A really large increase in the volume of traffic available can be caused only by the adoption by government and business in general of policies that will greatly stimulate production in the industries in which it is still lagging most—the durable goods industries. This plain fact relates the railroad problem to all the questions regarding the best means of promoting recovery now being so hotly discussed. Under such conditions

and policies as now prevail the railroad problem cannot be considered independently of the problems of other industries, because it cannot be solved without solution of the problems of reviving production and employment in other industries. The railways, therefore, are vitally concerned with the struggle between the New Dealers and their opponents, because the success of the latter appears essential to full restoration of production by the industries from which the railways derive their traffic.

If production, and consequently the total volume of traffic available for all carriers, were fully restored the railroads would still be confronted with great difficulties in getting their share of the available traffic unless important changes in policies, governmental, railroad and otherwise, were made. They are still handicapped by subsidies received by their competitors and by unequal regulation. They are the only means of transportation prohibited from charging a lower rate for a longer than for a shorter haul in order to meet competition for the longer haul that does not exist for the shorter haul. The Pettengill bill to repeal the long-and-short-haul section of the Interstate Commerce Act was passed by the House at its recent session by a large majority, but its passage by the Senate was prevented by a one-man filibuster by Senator Wheeler, chairman of the Senate Committee on Interstate Commerce. It seems probable that its passage can be secured at the next session of Congress if energetic efforts to this end are continued, as they undoubtedly will be. There should be no abatement of efforts to secure both State and Federal Legislation to reduce or eliminate all the Government-made handicaps to which the railways are subject in competing with other carriers.

Transportation Competition and Wages

Undoubtedly the most serious handicap to which the railways are subject, however, is their present wage schedules; and government is only partly responsible for them. They prevent the earning of as much net operating income as should be derived from present gross earnings. They also greatly increase the difficulty of increasing earnings by meeting the competition of other carriers the wages paid by which are much lower and the labor conditions of which are less burdensome. The railway wages established by eliminating the 10 per cent deduction from basic pay had been in effect a full year on April 1, 1936. It is, therefore, possible now to make approximately accurate comparisons of present and past wages.

In 1931, the last year before the 10 per cent deduction was made, the average railway employee was paid for 2,414.4 hours and received $1,664, or 68.9 cents an hour. In 1933, the only year throughout which the 10 per cent deduction was in effect, the average employee was paid for 2,299.3 hours and received $1,445, or 62.0 cents an hour. In the year ended March 31, 1936, the average employee was paid for 2,445.5 hours and received $1,694, or an average of 69.3 cents an hour. Annual earnings are the measure of an employee's income; but hourly wages are the measure of labor costs to the employer. The average hourly wage of 69.3 cents in the year ended on April 1, 1936, was the highest in history, comparing with previous peaks of 67.6 cents in 1920 and 68.9 cents in 1931. It yielded average weekly earnings of $32.57.

Wages on Railways and in Manufactures

A survey made by the National Industrial Conference Board shows that in April, 1936, the average hourly wage in twenty-five branches of the manufacturing industry was 61.4 cents and average weekly earnings were $24.08. In other words, the average hourly wage in the railroad industry is now about 13 per cent higher than in the manufacturing industry, and average weekly earnings of employees of railways about 35 per cent higher than those of employees of manufacturers. It is not possible to make similar up-to-date comparisons with the wages paid by other carriers, but it is notorious that those paid by the railways are much higher. The *Railway Age* has been pointing out one reason why the average hourly wage on the railways shows the increase that it does—viz., the increase in the speed of trains, both passenger and freight. Train service employees being paid on a mileage basis, the faster trains are run the fewer hours they have to work for a day's compensation and the higher their hourly wages become.

On the basis of the number of hours for which employees were paid in the year ended March 31, 1936, the increase in the average hourly wage from 62.9 cents in 1933 to 69.3 cents in the year ended March 31, 1936, cost the railways $157,235,000 in the latter year.

Expensive Working Rules

We are still in the midst of a great depression. Railway gross earnings are still almost 40 per cent less than in 1929. Never before in the midst of a great depression did the railroad or any other industry in this country pay higher wages than it ever had at the height of prosperity. It is not, however, the high hourly wages alone, but also the rules under which they are applied, that are burdensome. In order better to meet outside competition the railways need to render a more frequent service, and can afford to do so only when they can afford to run shorter trains, especially passenger trains. Requirements regarding the number of employees that must be used on each unit of service are a serious or insuperable obstacle to the rendering of an adequately frequent service.

Present wage scales and rules are advantageous to those now employed; but how about their effect on the almost 600,000 railway men still unemployed, many of whom could be re-employed if readjustments in working rules were made which would enable the railways to render more frequent service? And how about the

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effect of present working rules and wages upon the return received by owners of railroad securities and upon their attitude toward the railroad industry and its management? And how about their effect in curtailing railway buying from the manufacturing and other industries, and thereby curtailing employment in the industries from which a larger amount of railway buying would otherwise, directly and indirectly, be done?

"United We Stand"—

The most important essential to restoration of railway earning capacity is an increase of traffic. Second only in importance is a reduction of operating costs, and especially labor costs. If the present highest wage scales in history are to be maintained throughout the rest of depression, regardless of how long it lasts, then certainly the problem of securing modifications of working rules that make present wage scales needlessly expensive should be attacked. It can be attacked to any purpose only by the railroads unitedly. They ought to be able to develop the unity and courage necessary effectively to attack it. We have not observed any lack of initiative, unity and courage on the part of labor leaders in making and pressing demands for wages, working conditions and legislation tending to push the railroads toward bankruptcy and government ownership, and only a partial lack of unity on their part in expressly advocating government ownership.

One of the purposes of organization of the Association of American Railroads was to reduce forms of competition among the railroads themselves tending to prevent increases in the net operating income of the industry. No doubt some forms of competition between them are desirable. But what kinds and how much are desirable from the standpoint of the welfare of the industry especially in view of the outside competition to which it is subject? Has there been, since the organization of the Association a reduction of the kinds and amount of inter-railway competition that are undesirable? Perhaps we are wrong, but it is our conclusion, based upon widespread observation, that there has been an increase rather than a reduction.

Competition and Controversies Between Railroads

A statement issued on behalf of the Association when it was organized said: "The new organization will take the initiative in attacking the problems which confront the industry. * * * The new organization constitutes an aggressive and determined effort to deal with common problems. It is the purpose of this movement to include every phase of railroad transportation and to employ every constructive approach, not merely in the solution of difficulties, but in hastening and directing improvement and development of the industry * * *"

Article 19 of its Articles of Organization says: "It is hereby declared to be the policy of the Association that all controversies between Members of the Association should be settled by arbitration, and the Members of the Association agree that, in any controversy over which the board of directors has assumed jurisdiction and has decided by the affirmative vote of three-fourths or more of its members, they will accept and carry out such decision or, within twenty days, institute arbitration proceedings as hereinafter provided." There have been numerous controversies since then. Some have even been carried to the Interstate Commerce Commission. How many have been settled by the means prescribed by the articles of organization of the Association of American Railroads? How many have been even submitted to determination by these means?

The difficulties that must be overcome in rebuilding the railroad industry, especially its earning capacity, are too numerous to be listed, much less commented upon, in a single editorial. They require initiative and enterprise by individual managements, and such initiative and enterprise are being shown. They also require a high degree of co-operation and united action by railroads as a whole. It can hardly be said that the measure of co-operation and united action needed to advance the welfare of the industry has as yet been attained.

Journeys by Rail

I am one of many who began to drive a car about twenty-five years ago, using it for many years much as the horse and buggy had been used before it—on short hauls to station and market and an occasional Sunday afternoon ride, the latter extending sometimes as far as forty miles for the round trip.

Later I found myself employing the car also for the yearly journey to and from a summer resort in New England, a round trip of three or four hundred miles. Fifteen years ago, when it was still something of an adventure, I made my first round trip to Florida in an automobile.

About this time the occasional Sunday afternoon began to extend itself into a week-end ride. On a fine autumn week end I would make as much mileage as formerly to and from a summer resort, and I continued to make that annual excursion in a car.

About ten years ago I began commuting in my car, a forty-two-mile round trip every working day of the year, rain or shine. I used my car more and more for travel and recreation, went as far as the Pacific Coast in it several years ago; out through the Southwest, home through the Middle West and Ontario. For ten years, until a few months ago, I had used a railroad so rarely that it was genuinely a novelty to ride on one again; a novelty that I hope to enjoy more and more now that the railroad has begun to compete with the car in economy; to surpass it in safety so far that it can hardly be said to compete.

Fortunately, while the manufacturers of automobiles in hot competition with one another have been giving into the hands of fools many times as much power and speed as any wise man wants, the railroads have been accepting more and more successfully every year complete responsibility for the safety of their kind of transportation.

This and the very high degree of comfort offered in air-conditioned trains, plus the decrease in fares, will win me away from the use of my car for any other purposes than the original one with which I began years ago. I am one of many, I feel sure, who will now give the long mileage to railroads.

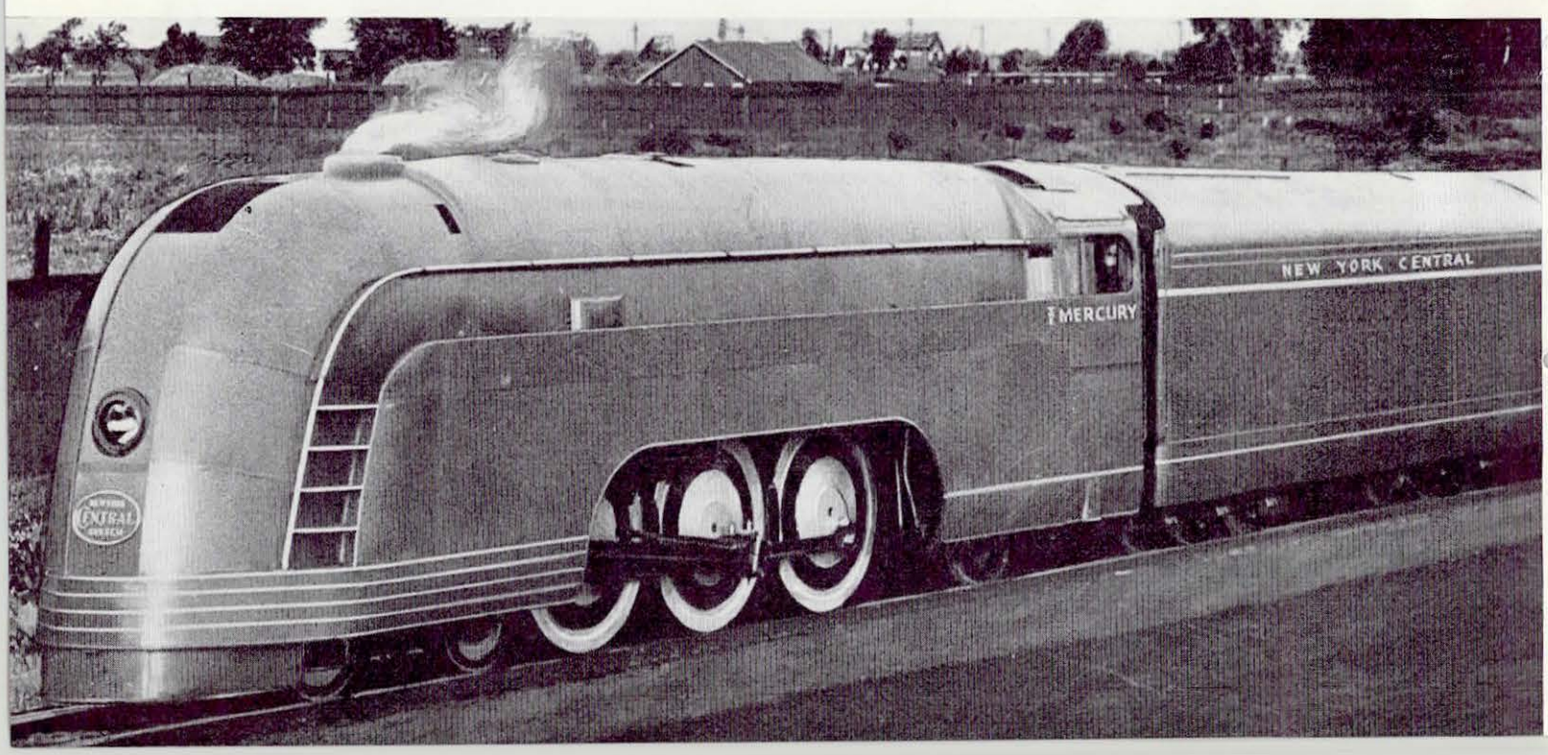
—T. Hills, Jr., in a letter to the editor of the New York Herald Tribune

New York Central Builds Distinctive Streamline Train

New use of color and form matched by improved smoothness of performance in equipment for high-speed Cleveland-Detroit run

"THE Mercury," a completely streamline steam train for high-speed service on the New York Central between Cleveland, Ohio, and Detroit, Mich., was christened with fitting ceremonies at Indianapolis, Ind., on June 25, where it had been completed at the Beech Grove shops of the New York Central System. The train, which consists of seven coaches, two of which are fitted for Pullman parlor-car service, represents a complete departure from conventional facilities, from conventional architectural and decorative treatment and from conventional connections between cars. These changes combine to produce a train free from the corridor-like appearance characteristic of the interiors of long passenger cars; a train which starts and stops with an absence of shocks attainable only by the complete elimination of uncushioned slack; a train, the riding of which is smooth and free from vibrations.

The complete interior and exterior of the train, including the exterior of the locomotive, was designed by Henry Dreyfuss, industrial designer, working in close



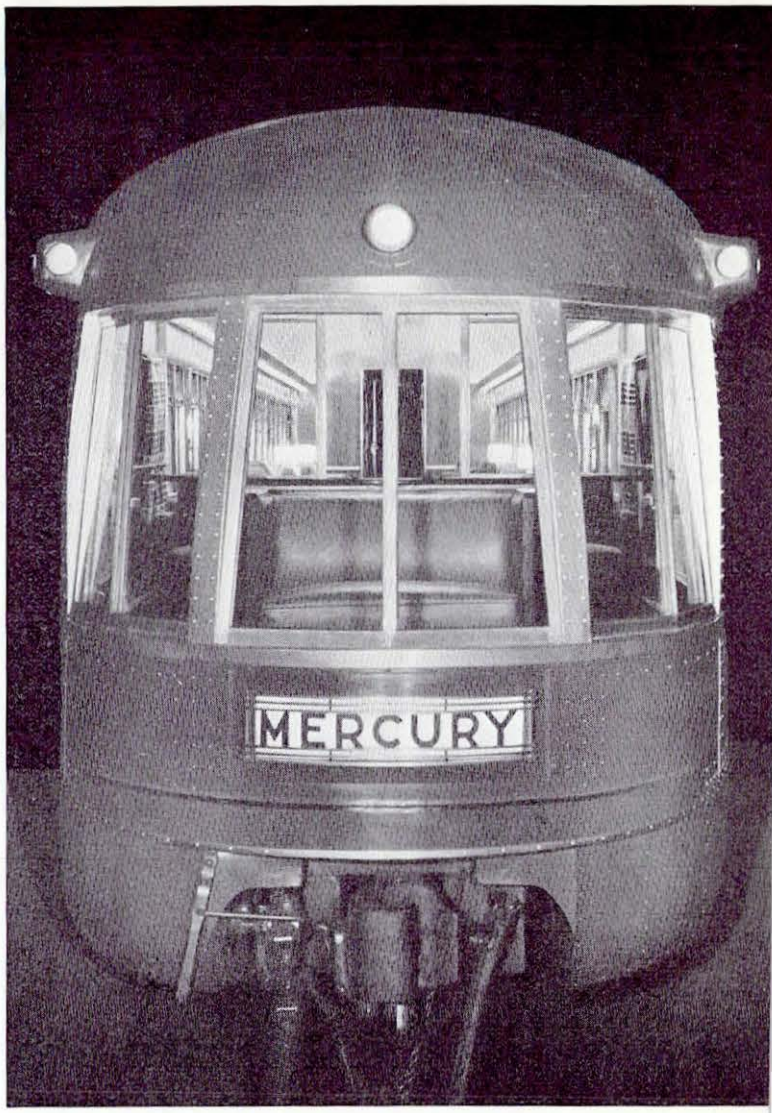
co-operation with the New York Central's equipment engineering department which was responsible for the execution of the designs and for working out all of the mechanical features of the train.

The train is intended for daily round-trip service between Cleveland and Detroit, on which it will be inaugurated on July 15. The distance between terminals is 164 miles and the run each way will require 2 hrs. 50 min., a schedule speed of 57.9 m.p.h. On Mondays to Saturdays, inclusive, the daily schedule provides for departure of the train from Cleveland at 7:30 a.m., arrival at Toledo at 9:15 a.m., and at Detroit at 10:20 a.m. Returning, it will leave Detroit at 5:35 p.m., arrive at Toledo at 6:35 p.m., and at Cleveland at 8:25 p.m. On Sundays the westbound trip will be on the same schedule as on weekdays, but on its return trip it will leave Detroit at 6:30 p.m., arrive at Toledo at 7:30 p.m., and at Cleveland at 9:20 p.m.

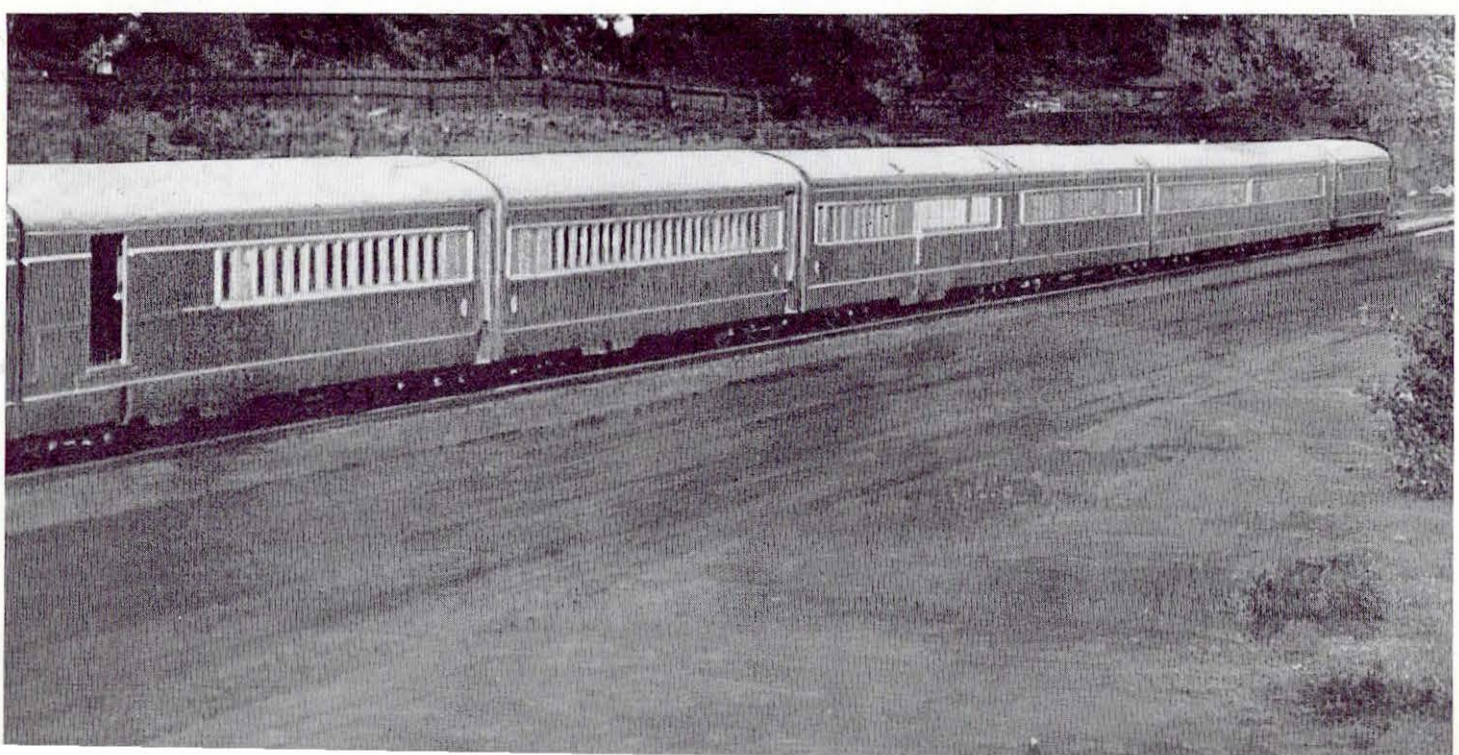
Train Designed as Complete Unit

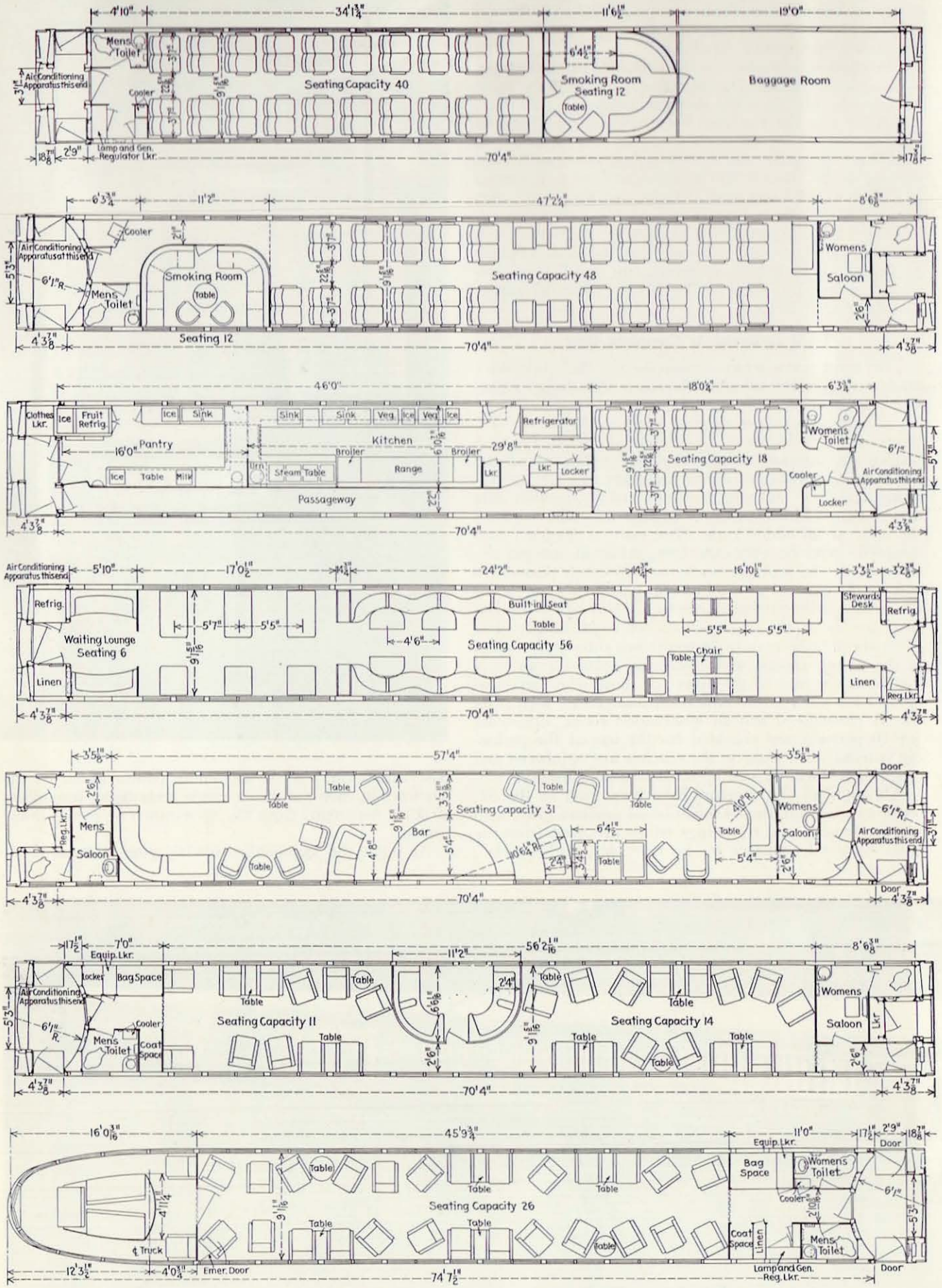
The seven cars which constitute the Mercury were originally built for suburban service. The design represents an especially effective and efficient distribution of metal and each of the original cars, ready for service, weighed about 54 tons. In adapting them to the new service the interiors were completely removed and the end structures changed where necessary to close up vestibule side-door and step openings and to accommodate diaphragms which completely enclose the space between the ends of adjoining cars. The train is designed as a complete unit, no two cars being alike in interior arrangement. It provides seats for 106 coach passengers and for 57 persons in the Pullman parlor cars, including six in the parlor-car compartment. There are additional seats for 24 in the two spacious coach smoking rooms. Fifty-six persons may be seated at one time at the tables in the dining rooms, with additional seats for six in a lounge at one end of the diner for those who may have to wait for seats at the tables. A lounge car, with seats for 31 passengers, and an observation room, with seats for 10 persons, are provided for the use of the parlor-car patrons. All seats in the coaches are numbered and coach tickets will be sold up to the seating capacity.

Although no bright colors have been used on the exterior of the train, the combination of medium gray, with scratch brush metal trimmings which are used from the front of the locomotive to the rear end of the parlor-observation car and the aluminum panels which tie the windows in each car into a single wide band, provides a striking departure from the appearance of conventional trains.



At night the locomotive running gear is floodlighted





Floor Plans of the Seven Cars of "The Mercury"

from lamps concealed under the skirt below the running board.

Interior of the Coaches

The interior of the train is notable for the variety of architectural treatments employed in the various cars and the way in which a variety of colors has been used. The repetition throughout the train of the colors selected tends to tie the cars together as a unit, although the way in which these colors have been combined varies in the different cars. The colors include tans, browns, musk, rust, bright blue, green, bright red and gray. All the china, silverware and glassware have been designed especially for this train.

The train consists of a combination passenger-baggage car, a coach, a combination kitchen-coach, a dining car, a lounge car with a bar, a parlor car and a parlor-observation car. The coach compartments in the first three cars all have arched ceilings above the center of which is an air duct of large cross-section. Below the center of the ceiling is supported a wide shallow trough which serves as a diffuser of the conditioned air from the duct above the ceiling and as a reflector of the indirect lighting which furnishes general illumination for the coach interiors.

The under side of the baggage racks is solid and curves into the side wall above the windows. A tubular section at the outer edge of the racks encloses the lights for the individual seat units.

The passenger compartments in the first three cars are furnished alike. The ceilings are a light gray tan. This is relieved by a wide horizontal aluminum molding below the center lighting trough. The wainscoting is light chocolate. The under side of the baggage rack and the side walls to the window sills are scratch brush aluminum. The window sills and belt-rail molding are black Alumilite. The rotating double seats have scratch brush aluminum frames and are upholstered in brown mohair with stripes running diagonally. The floors are finished with a $\frac{3}{16}$-in. marbleized rubber tile in a soft blue-green tone and this color is repeated on the inside of the crash texture of the window shades.

The monotony of the seating arrangement in the second coach is varied by placing a built-in seat against the bulkhead at the forward end. At approximately the middle of the car on each side are placed two built-in heavily upholstered chairs with a small ebonized table and a reading lamp between. For contrast these chairs are upholstered in blue-green mohair with narrow vertical stripes. The lamps have plain Alumilite metal bases and ivory shades edged with black.

An outstanding feature of this coach is the employment of photo murals on the bulkheads at the ends of the main passenger compartment. That at the front end is a view of Detroit from the river and at the other, a view of Cleveland, a portion of which is cut away by the glass-enclosed opening looking into the smoking room. On the bulkhead between the kitchen and passenger compartment in the third car is a framed photograph showing a view of Toledo.

At the front end of the coach portion of the combination passenger-baggage car is a smoking room with lounge seats, sections and chairs for 12 passengers. This compartment, which extends entirely across the car, is separated from the baggage room by a semi-circular partition and by glass from the passenger compartment. The ceiling is finished in medium buckskin tan, which color is repeated on the inside of the window shades. The side walls in this room, including the wainscoting and doors, are done in metallic blue. The upholstery material is leather. The seats and sections are in a color similar to the ceiling, and the chairs in a bright blue. The tables have black Formica tops, and the black is repeated in the Alumilite window sills and capping. The floor is covered with $\frac{3}{16}$-in. dark brown, mottled rubber tile.

At the rear end of the second coach is another smoking room, with seats for 12, which is decorated and furnished the same as that in the first car. To make it equally available to men and women a glass-enclosed opening extends half way across the bulkhead and along the corridor to the door. In this case the door is scratch brush aluminum finish.

The floor plans show the location of the men's and women's saloons. They are a departure from the dreary rooms found on most trains. The men's saloons are in tones of burnt orange, with mottled black and mahogany rubber-tile floors. Original Rockwell Kent lithographs are used on the walls as decorations. Various shades of musk and rust make the women's saloons bright and attractive and reproductions of brilliant Gauguin paintings are on the walls. Plum colored chintz draperies are used in the women's saloons.

The corridors in the second coach and passageways between the saloons and lockers in the others are finished in light chocolate with scratch brush bases. Luminator lighting fixtures are placed in the ceilings. The side wall and partition in the long corridor at the side of the kitchen are finished in scratch-brush aluminum from ceiling to window-sill level, as are the doors at the ends of the passage. The ceiling is in bright red with 20-in. circular areas of white around all ceiling-light fixtures which are painted red. The floor is dark blue rubber tile, with a smoky gray wainscoting.

Light Weights of the Cars of The Mercury

Passenger baggage car	125,240 lb.
Coach car	126,100 lb.
Kitchen-Coach car	148,520 lb.
Dining car	123,280 lb.
Lounge car	124,320 lb.
Parlor car	123,700 lb.
Observation-parlor car	122,260 lb.

Wall sockets are provided in the coaches for tables at all the seats. Both single and double tables are provided. These have tops of Plymetl covered with plain black linoleum with satin chrome finish binding and can be used to serve meals at the coach seats.

Dining Facilities

Because of the relatively short trips, both of which include meal hours, it was necessary to provide facilities for serving quickly a large number of passengers. Hence, an unusually large kitchen and serving pantry occupy about two-thirds of the third car and the fourth car is devoted entirely to dining service, seating 56 persons at one time.

The dining room is divided into three sections. The end sections have the customary arrangement of tables and chairs. The chairs are aluminum with tan leather upholstery. The middle section is fitted with built-in leather upholstered seats with the backs against the sides of the car and semi-circular tables for two facing on the aisle. The sides and ends of this car are finished throughout in plain quartered walnut Flexwood with the grain running vertically. The ceilings in the end sections are horizontal with a shallow, flat clerestory recess at the center, finished in buckskin tan. Through openings in the sides of the clerestory recess conditioned air enters the car. The lighting is of the louver type, the units being placed transversely across the lower ceiling level over each table location on either side.

In the center section of the dining room the ceiling,

also finished in buckskin tan, is carried down in a sweeping curve to the tops of the windows. Below the center of the ceiling, in a wide band of blue, is an air diffuser and indirect lighting fixture somewhat similar to those in the coaches. The seats in this room are upholstered in blue to match the wide band in the middle of the ceiling. The floor throughout the car is covered with carpet with a broken stripe pattern in two tones of rust.

The three sections are separated by double partitions about a foot apart, having clear plate glass above the wainscoting. Between these glass walls on each side of the aisle provision has been made for blooming plants or cut flowers, illuminated by special ceiling fixtures.

The windows of the dining car are fitted with venetian blinds with rubber anti-rattlers. The slats repeat the ceiling color. The tapes are rust to match the carpet. The window sills are black Alumilite.

Aside from its varied seating arrangement and large capacity, one of the outstanding features of this car is the waiting lounge at the rear end, partially separated from the adjoining dining room by narrow bulkheads on either side of the aisle. The lounge is fitted with built-in settees on either side upholstered in light tan leather, each providing seats for three persons. Attractive touches on the walls of this lounge are the framed copies, in colors, of Cezanne paintings.

The kitchen is 29 ft. 8 in. long and the pantry at the end of the car adjoining the dining car is 16 ft. long. The pantry opens through double doors into a vestibule at the end of the car which is separated from the corridor alongside the kitchen by a door. There is no provision for closing this vestibule at the end of the car. The end of the dining car, however, is closed with double swinging doors, operated electro-pneumatically by an electric eye mounted on the end posts of the kitchen car. Push plates which can be readily operated by the elbow are provided at the end of the kitchen car for alternative use and in the dining car to operate the doors when returning to the kitchen.

A service door is provided at the kitchen side of the car near one end of the kitchen and at the vestibule on the opposite or corridor side.

The Lounge Car

The car back of the diner is entirely devoted to lounge facilities. In the middle, against one side, is a semicircular bar backed up by mirror panels extending from the top of the bar to the ceiling, which gives the impression of increased width to the car. Heavily upholstered loose chairs, built-in settees and sections are conveniently arranged on either side of the bar.

The ceiling in this car is flat and relatively low, which, with the vertical grain of the quartered walnut Flexwood finish on the walls, combines to create a sense of unusual spaciousness. The ceiling is covered with Tekko paper having a bronze metallic finish in a plaid effect, and the floor is covered with a rust carpet similar in pattern to that in the diner. The windows of the lounge car, like the diner, are fitted with venetian blinds, the slats of which are finished in light tan with tapes in rust to match the carpet. The window sills and capping are in black Alumilite.

The front of the bar is finished in natural butt walnut; the top, base and trim are ebonized mahogany. All of the furniture in this car is upholstered in leather.

Top to Bottom: The Bulkheads of the Second Coach Are Decorated with Photo Murals of Detroit and Cleveland Skylines—The Smoking Room in the Second Coach—Looking Forward in the Dining Car

The built-in settees are in red, the sections in light tan, and the loose chairs in green. Various styles of tables and smoking stands are conveniently placed.

Except for the lights over the bar and the ornamental louver type ceiling fixtures near each end of the compartment, direct lighting is provided along the sides and bulkheads just above the tops of the windows. The lamps are concealed behind the upper wall finish, with the light distributed directly downward through louvers to provide reading light intensity at the seats around the walls of the room. The outlet from the air-conditioning duct is covered by a decorative band of scratch-brush aluminum extending along the ceiling near the sides of the car and following the curve of the bulkheads at the ends of the lounge compartment.

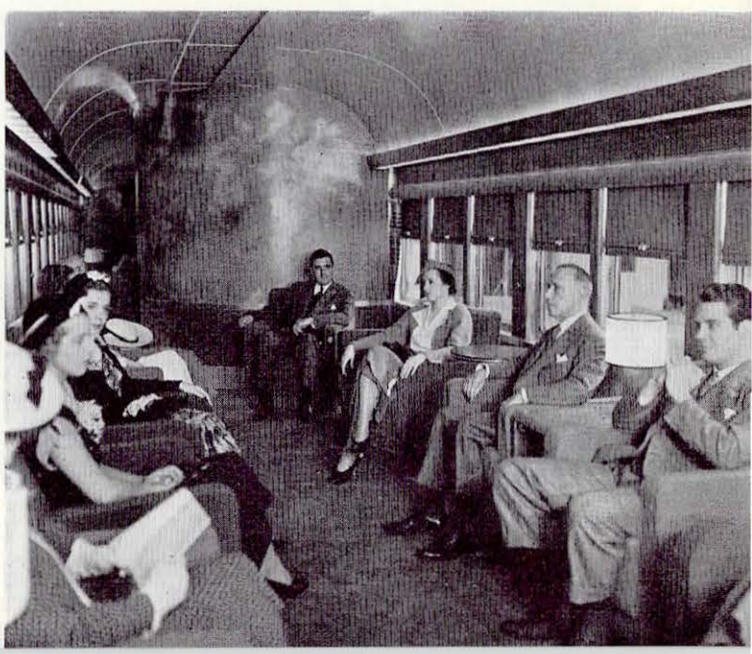
The Parlor Cars

Both parlor cars are similarly decorated. In these cars the buckskin tan ceilings curve down to the sides. The sides and end bulkheads are finished in plain quartered walnut Flexwood. Between the tops of the windows and the lower edge of the ceilings the grain runs horizontally, while between the windows and on the ends it runs vertically. The wainscoting is a natural cork of much the same tone as the walnut. The curtain molding and 8-in. base are of scratch brush aluminum finish. Window sills and capping are plain Alumilite. The carpets in these cars, of the same broken stripe pattern as in the dining and lounge cars, are a soft blue-green tone, and this color is repeated in the window shades.

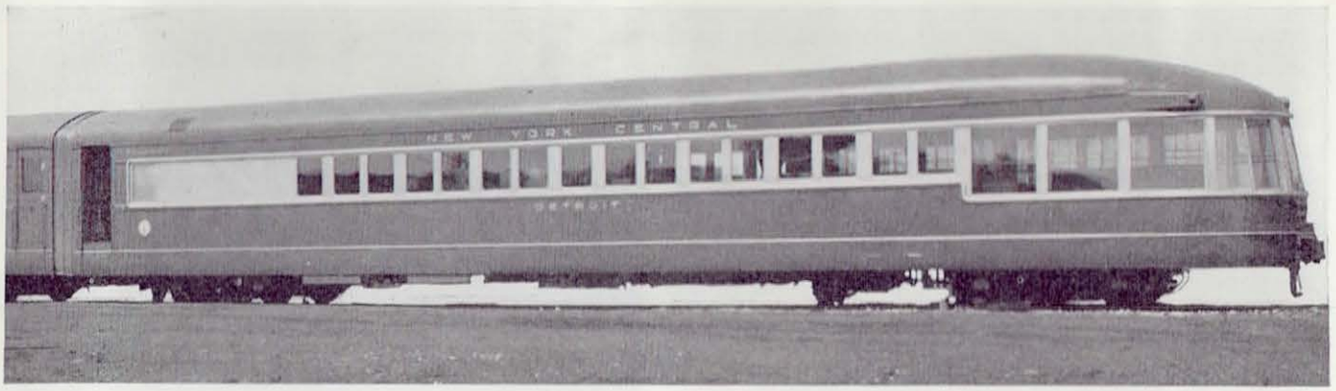
The chairs, although generally similar in form, have been upholstered in a variety of colors and fabrics. The rectangular lamp tables are finished in walnut. The bodies of the lamps are finished in rust and blue-green and the shades are ivory edged with black. Several movable circular tables are provided in each car. These have black Formica tops, with Alumilite metal bases and trim. The lighting of the parlor cars is provided by troughs along the sides placed at the base of the ceilings. These are arranged to provide indirect lighting from the ceilings and direct reading light at the chairs through louvers at the bottom.

The high point in the decoration of the first parlor car is the cloud mural with which the outside walls of the semi-circular compartment in the middle of this car are finished. The location of the compartment itself and the possibility for some variation in the arrangement of the loose chairs relieves the corridor-like effect of a long, unbroken interior.

The observation room at the rear of the second parlor car represents a marked departure from the customary arrangement of such compartments in two respects. Instead of arranging chairs about the sides of the room a fixed center settee has been built in with seats for three persons on each side facing toward the windows and with seats for two persons at the rear end facing directly toward the windows in the end of the car. Two additional chairs are provided, one at each side against the glass partition which separates this room from the main compartment of the car, both thus facing toward the rear. The other respect in which this room departs from American custom is in the lowering of the window sills approximately one foot below the standard height throughout the rest of the train. The windows



Top to Bottom: Waiting Lounge in the Diner—The Lounge Car—The Compartment Bulkheads in the Parlor Car Are Decorated with Photo Murals of Clouds



The Streamlining at the Rear of the Train

are nearly four feet high. This compartment thus becomes in fact, as well as in name, an observation room.

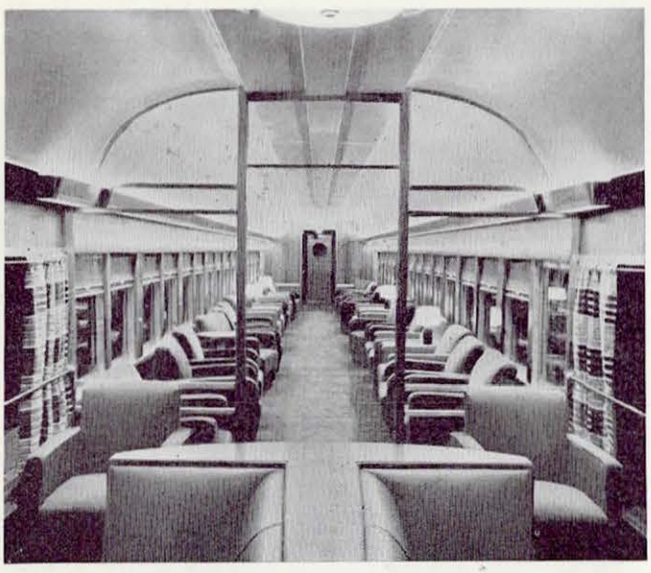
The men's and women's saloons in the lounge and parlor cars are fitted and finished the same as those in the coaches.

A convenience for parlor-car passengers is the roomy bag locker in each of the two rear cars. These lockers, fitted with deep shelves, provide for the checking of hand luggage by the porter. The lockers are closed by a roller curtain of aluminum. Across the aisle from each baggage locker is a recess fitted with hangers for the storage of coats or wraps.

The Vestibules

With the exception of the dining car, which has none, there is a single vestibule at one end of each car. Those in the second and third cars and in the two parlor cars adjoin each other and in each case have been treated so that, together, they form an unusually spacious lobby between the cars.

In carrying out this scheme the vestibule end posts have been changed to give a clear passage between cars of 5 ft. 3 in. and the body ends have been replaced with walls built on a circular arc. The effect is to create a rotunda from which open the vestibule side doors and the doors into each car. The vestibule at the front end of the club car, next to the diner, is similarly treated, except that because of the absence of an adjoining vestibule, the spacing of the end posts was not changed from the original of 3 ft. 1 in. The vestibule at the rear end of the first car is of conventional form.



Looking Forward from the Observation Room

The unusual character of the double vestibules is brought out strikingly by their decorative treatment. The ceilings and side walls down to the wainscoting molding are finished with aluminum paint, with the vestibule curtains in the same color. The wainscoting is in smoky gray and the floors are covered with blue sheet rubber. All the doors are in bright red with lettering in dark gray. In the center of the floor of each vestibule is a large circle of light gray, against which the initials of the road are inlaid in red.

Structural Features

The steel cars in The Mercury were originally built for steam suburban service. The coupled length of these cars was 78 feet 11¾ in. and they had a seating capacity of 96 persons, with a weight of slightly less than 54 tons. They were built with turtle-back roofs and without hoods at the ends, the roof sheets extending in a straight line to the intersection with the vestibule end sheets.

The underframes of these cars have 12-in., 35-lb. channel center sills, framed into integral steel platform and body bolster castings at the ends. The cross-members are of pressed steel, with cover plates, and the side sills are rolled angle sections. The end construction consisted essentially of 6-in., 12½-lb. I-beam vestibule end posts riveted into the platform casting at the bottom and tied into the horizontal collision bulkhead over the vestibule. The cars originally had similar body end posts with Z-bar corner and intermediate posts, the former being tied into the platform end castings. The body structure consists of ⅛-in. pressed flanged channel posts, 4 in. deep, with the 3/32-in. outside sheet forming the post covers between the windows. The side plate is a 4-in. rolled Z-bar and the belt rail is of 4-in. by ⅜-in. rectangular section. The roof construction consists of flanged channel carlines of 3/32-in. steel with three pressed-steel Z-shape purlines fitted between the carlines. Below the windows the outside sheathing is of ⅛-in. steel plate, while the post covers and letterboard are of 3/32-in. steel. The roof sheets are of 1/16-in. copper-bearing steel with butt joints over the carlines which were made tight by welding.

The cars were insulated with three-ply ¾-in. hair felt which, except above the windows, covers the entire inside surface of the outside sheathing on the sides, ends and roof and is also used under the floor. Two-ply ½-in. hair felt is applied on the outside surface of the inside finish above and below the windows and one-ply ¼-in. insulation on the inside surface of the letterboard.

In adapting the cars to the new service certain changes

were made in both the body and vestibule end construction of some of the cars. At one end of the coach, the kitchen car, lounge car and the first parlor car the vestibule has been closed up and the vestibule space included within the body of the car. No change was made in the vestibule end construction, at these locations the relatively wide end-post spacing of 3 ft. 1 in. in the original cars being considered satisfactory for the new service. In the combination passenger-baggage car at the head end of the train no changes in the end structure were required. The original platform steps were replaced with the O. M. Edwards folding steps in all of the vestibules of the train. These steps, when folded up by the closing of the vestibule trap door, close the space under the vestibule door and form a continuation of the side surface of the car.

All side windows are fitted with double aluminum sash furnished by the O. M. Edwards Company. The outside sash is built in flush with the car exterior and the inside sash is hinged to permit removal for cleaning.

Where the vestibules were closed the alterations involved the removal of the body ends and the addition of a side sill, side posts and floors over the step wells. The collision bulkheads were reinforced throughout the train.

To provide for the observation room at the rear of the second parlor car the entire body structure at the end of the car had to be torn down to the platform casting and rebuilt. The same center construction was retained and reinforced and the body rebuilt with the belt rail dropped $11\frac{11}{16}$ in. to provide windows with openings 3 ft. $9\frac{11}{16}$ in. high (vertical projection) and an unusually wide angle of vision. The end of the car is not only curved in form on the horizontal projection, but is also streamline in a vertical plane as well. This presents a rear end with warped surfaces and the problem of windows around the end of the observation room was a difficult one. This has been worked out, however, in such a way as to avoid completely the use of curved glass, the sash being designed to provide a minimum of interference with the vision of the occupants of the observation room.

The Chanarch construction has been retained, but the composition flooring has been replaced with rectangular cork strips laid in asphaltum Masticoke in the channel

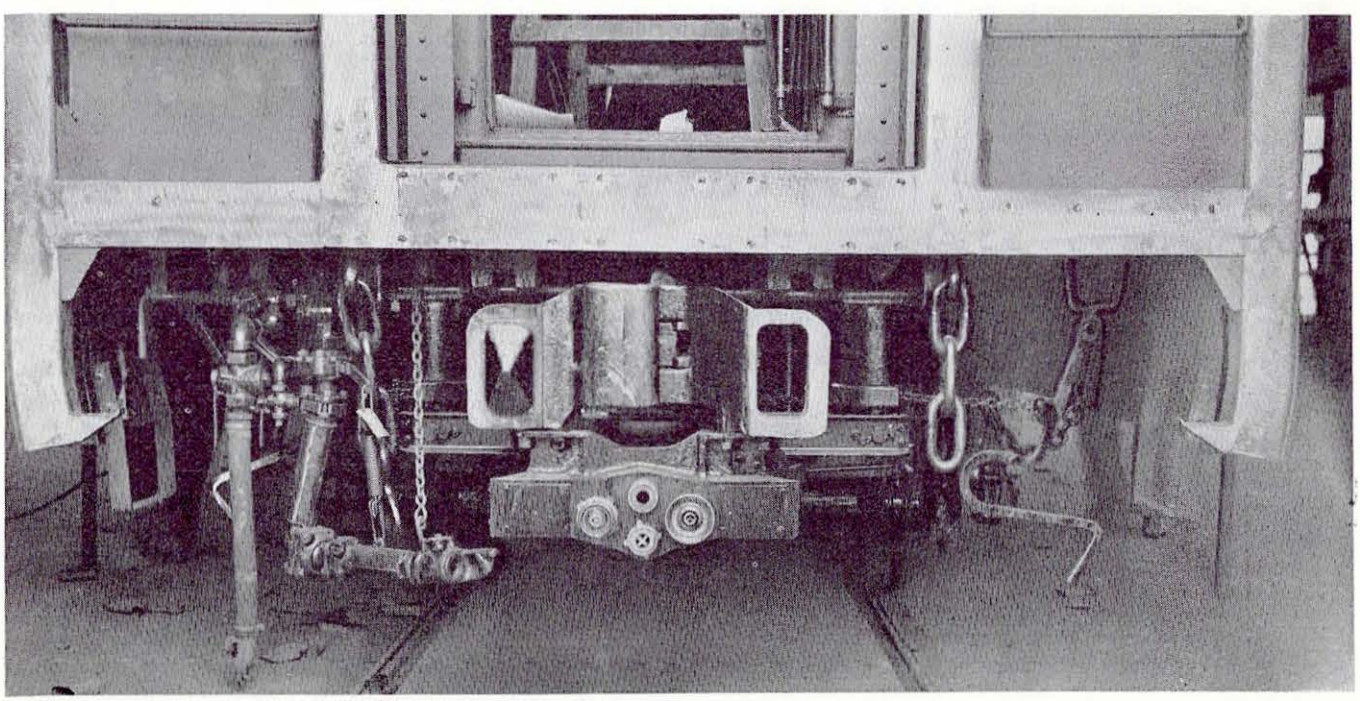
One of the Women's Lavatories

recesses. A layer of $\frac{3}{8}$-in. slab cork is then cemented in place in the coaches and corridors where a rubber tile surface is used. Where carpets are laid, $\frac{1}{2}$-in. slab cork is used with the top surface sanded. In the dining and lounge cars the carpets are laid on Super-Pneu pads. In the parlor cars U. S. Rubber carpet cushions have been employed.

The interiors of the cars have been finished throughout with aluminum, including ceilings, sides and partitions, in the application of which spot welding, riveting and screws have been employed.

The kitchen and pantry walls and the cupboards are stainless steel. The floors are laid with Alcoa floor plate.

One of the factors in the comfort of passengers is the elimination of diaphragm noise between the cars. This has been accomplished by the use of diaphragms designed and built by the railroad. A patent covering the features of this design has been applied for. The only



The O-B Tight-Lock Coupler and Connector

movement permitted between the diaphragm and the end of the car is the longitudinal compression and the angular movement about a vertical axis necessary to accommodate relative movements of the cars. Lateral movement or torsional movement between cars about a longitudinal axis is taken by the sliding of the lightly loaded face plates on each other.

These diaphragms enclose the entire space between the ends of adjoining cars. The outer surface is formed of sheet rubber.

The Trucks

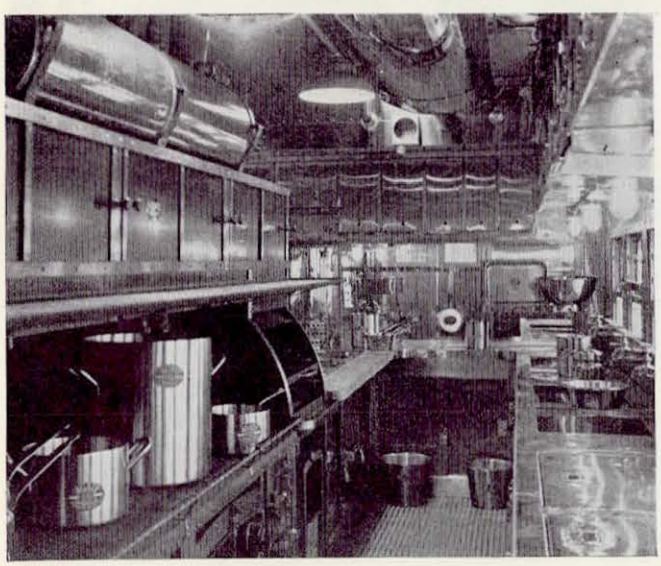
With the exception of the kitchen car, the cars are all carried on trucks with the original frames and bolsters. They are of the four-wheel double drop-equalizer type, with a wheel base of 7 ft. The rolled-steel wheels are 33 in. in diameter, have conical treads and are mounted on 5-in. by 9-in. axles fitted with Timken roller bearings. Because of the added weight of kitchen equipment, the trucks on the combination kitchen-coach have been increased to 8 ft. wheel base and are carried on 5½-in. by 10-in. axles, also fitted with Timken roller bearings. The elliptic springs are of high-tensile, chrome-vanadium steel, and the helical springs of silicon-vanadium steel. These springs are unusually flexible and contribute materially to the smooth riding qualities of the cars.

The trucks have been fitted with sound-insulating material. Fabreeka pads have been placed on both the top and bottom elliptic spring seats and on top of the coil springs. Rubber pads are inserted between the equalizers and the tops of the journal boxes and between the truck frame and wear plates.

The trucks under the kitchen coach are fitted with American type clasp brakes. Those under the other cars are fitted with Simplex clasp brakes. The brake rigging is fitted throughout with Superoilite bushings and case-hardened pins, the pins in the truck brake rigging being of the Cooke type. The cars are equipped with New York Schedule UCB air brakes, with 16-in. cylinders on all cars except the kitchen car which has an 18-in. cylinder.

Connections Between Cars

The rear end of the tender and all of the cars, with the exception of the rear end of the observation car, are fitted with O-B Tight-Lock couplers and Waughmat



Interior of the Kitchen

The Rotunda Vestibules Are Unusually Spacious

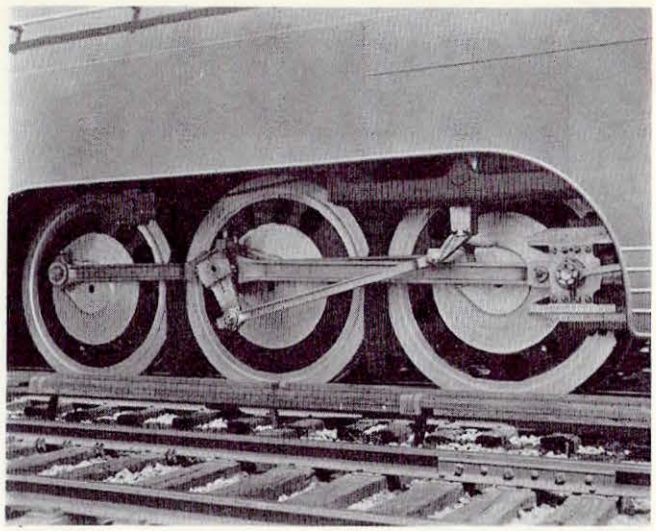
Twin Cushions and buffers. The Waughmat Twin Cushion without the buffer is installed at the rear end of the train. The rear end of the Tight-Lock coupler shank is fitted with the Ohio Brass type of ball connection which is secured in a socket at the front end of the yoke. This provides a free universal movement between the drawbar and the yoke. The coupler carrier provides for spring-cushioned vertical movement of the coupler shank and is fitted with a lateral spring centering device. The standard type of O-B uncoupling mechanism is utilized with levers accessible under each side of the car near the end.

Connector heads are attached to the under side of the Tight-Lock couplers. These provide automatic couplings for the air-brake, air-signal and steamheat train lines throughout the train. The connectors are provided with wings at either side for electrical connections. These, however, are all blanked, except on the couplers between the kitchen and dining car. Here they are fitted to connect the circuits required for the electro-pneumatic operation of the dining-car doors from the end of the kitchen car.

The Waughmat Twin Cushions at each end of the car are made up of two sets of Waughmat concentric springs of Spencer-Moulten rubber, each set consisting of a series of rubber springs and steel plates held between followers.

The Twin Cushions operate against abutments located in the center of the pocket with one Waughmat Cushion bearing against the front face and the other against the rear face of the abutment. The front follower of the forward spring assembly and the rear follower of the rear spring assembly bear against the inside ends of the yoke under an installed compression of about 8,000 lb. These follower plates do not contact front and rear lugs and, therefore, move forward and backward freely with the movement of the yoke. It is evident, therefore, that with the units operating in opposition to each other the balanced assembly is ready to respond to the slightest change in pressure either in pulling or in buffing, since one set of springs expands and unloads as the other is further compressed and loaded by a buffing or pulling force through the drawbar.

The buffer is provided with light springs in order that the pressure between the diaphragms may not be more than is essential to maintain proper contact between faces under all operating conditions. This pressure amounts to about 1,300 lb. with a compression of 2½ in. In



The Driving Wheels Are Finished in Aluminum and Black and Are Illuminated at Night

addition to the helical springs the buffer includes a series of Waughmat rubber springs which take the heavy buffing loads after the closure of the steel springs.

Lighting

The beauty of the train is greatly enhanced by the lighting system, which performs the dual function of serving as decoration and also giving adequate, well-distributed illumination. The overhead lighting in the main sections of the first three cars consists of continuous indirect ceiling fixtures. A row of 15-watt lamps on 10-in. centers along the ceiling is screened from view by a continuous suspended baffle which reflects light to the ceiling. An opening along the center of the baffle permits light to escape downward to a secondary baffle, which illuminates the bottom of the upper structure, and at the same time re-directs the air from the air-conditioning system.

Reading light for seated passengers in the main sections of these cars is supplied by baggage-rack fixtures. The units are located in a tube forming the outside roll edge of the baggage rack, with a 60-watt T8½ lamp over each seat. Transverse louvers at the bottom of the fixture protect the passenger from direct view of the light sources. The illumination intensity on a 45-deg. reading plane 33 in. above the floor varies from 8½ foot candles at the window to 5½ foot candles at the aisle end of the seat. Each light is controlled individually by a toggle switch.

The baggage compartment of the first car is lighted by three 50-watt and one 25-watt ceiling fixtures. The smoking room in this car receives light from two 50-watt and four 25-watt fixtures. These are located in an air-diffuser plate.

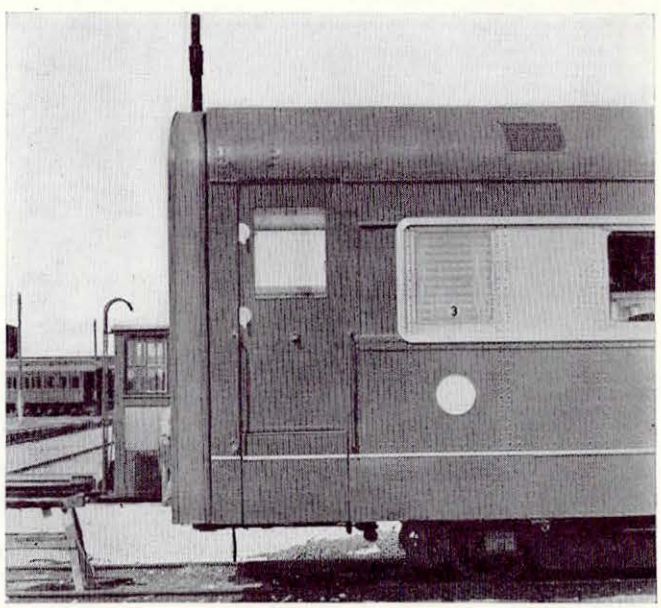
In the kitchen and pantry sections of the kitchen car, vapor-proof units are used. There are nine 50-watt and eleven 25-watt units.

In the center section of the dining car, two continuous indirect lighting troughs are installed. These units include 80, 15-watt lamps on 7-in. centers. The end dining sections are lighted by louvered flush diffusing panels, which extend from the side wall to the raised center portion of the ceiling. These are 12 of these units, each equipped with one 25-watt and one 50-watt lamp.

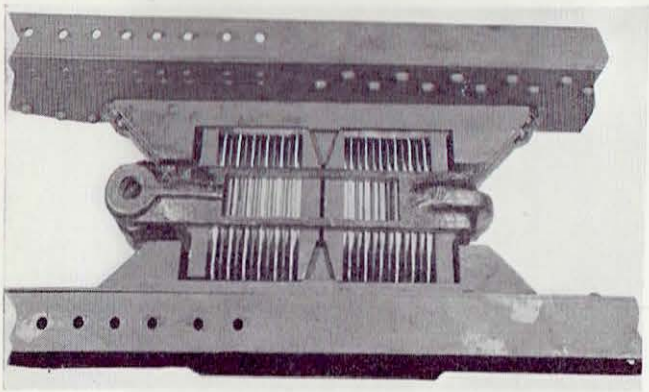
The semi-circular bar in the lounge car is lighted by eight 25-watt lens-type units, which direct a strong light downward onto the bar. Indirect illumination is also provided inside the bar by means of twelve 10-watt lamps mounted in a semi-circular trough suspended just below the ceiling. The semi-circular row of direct lighting units and the indirect fixture are reflected in the mirror back of the bar to give the illusion of complete concentric circles. The sections on either side of the bar are more softly illuminated by continuous inverted trough, direct units, fitted with 132 10-watt S-11 lamps on 10-in. centers. The under side of the trough is fitted with transverse louvers, which direct the light downward and conceal the lamps. The side louver lighting is augmented by the two circular louvered ceiling units, one at either end of the car. These are each equipped with one 100-watt lamp.

Maximum lighting intensities are obtained in the parlor and parlor-observation cars. The main sections of these cars are lighted by continuous louver side-trough fixtures, which are fitted with 25-watt lamps on 12-in. centers. The upper portion of the troughs are open to light the ceiling, and the lower portions, open for direct lighting of the seats, are fitted with transverse louvers. An illumination intensity of 10 foot candles is obtained on the 45-deg. reading plane over the chairs. This light is augmented by 50-watt table lamps, and in the rear end of the parlor-observation car, there is a combined air outlet and ceiling fixture containing three 50-watt lamps. It is placed centrally over the speedometer which is recessed into the top of the lounge seat. At passageway sections of the parlor car the trough is narrowed to provide requisite clearance. At these locations where lower light intensity is satisfactory, 10-watt S-11 lamps are used. These lamps which have an external diameter of only 1⅜-in. and a total length of only 2⅛-in. were specially developed to fit this requirement of a narrow trough and were afterwards used in the lounge car previously described.

In the summer when lighting requirements are at a minimum and power is required for air conditioning, the 25-watt lamps in the louvered fixtures will be replaced with 15-watt lamps. When these are used, the lighting intensity on the 45-deg. reading plane is 6 foot candles. In this way the large air-conditioning generators are used in off season to provide high lighting intensities



A Circular Plaque of Gray Aluminum with a Depressed Figure of Mercury and the Name of the Train Is Placed on the Sides of the Cars Near the Ends



The Waughmat Rubber Draft Gear with a Section of the Yoke Cut Away to Show Its Construction

which are more desirable, especially in the winter months.

The wide vestibules are lighted by two 25-watt and one 50-watt lens-type units. An intensity of 4½ foot candles is obtained at the edge of the platform and 2½ foot candles on the bottom step. Lens-type units are also used as locker lights and passageway lights at many locations throughout the train.

General lighting in the men's and women's saloons is supplied by one or two lens-type units. The mirrors in these rooms have horizontal recessed reflectors at the top and bottom, fitted with 30-watt Lumiline lamps. Three of the women's rooms are also equipped with built-in vanity table fixtures.

Four vertically-mounted fixtures, each containing two 30-watt Lumiline lamps, are used to light the waiting lounge at one end of the dining car.

Sixty-volt Mazda lamps are used throughout the train. This is a special rating, the 60-volt, rather than 64-volt lamps being chosen to insure that the lamps burn at full brilliancy when they are receiving their power from the battery, when the generator is not running.

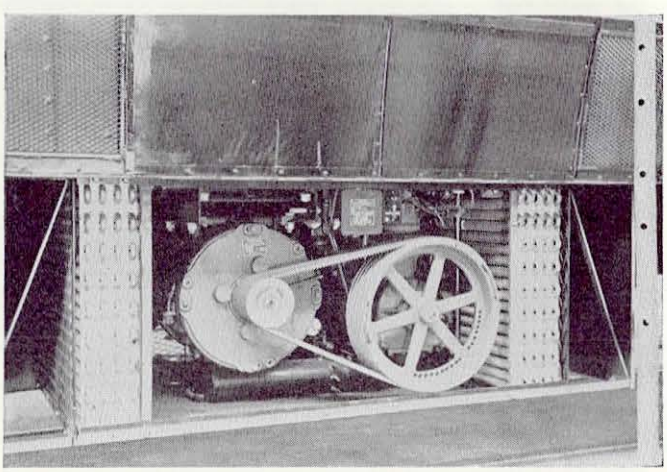
Back-up and marker lights are built into the rear of the parlor-observation car, the latter having a mechanism

General Dimensions and Weights of the New York Central "Mercury" Locomotive

Railroad	New York Central
Builder	American Locomotive Co. (Streamlined at N.Y.C. West Albany shops)
Type of locomotive	4-6-2
Rated tractive force, engine, 85 per cent. lb.	37,600
Weights in working order, lb.:	
On drivers	193,800
On front truck	66,300
On trailing truck	56,900
Total engine	317,000
Tender	292,300
Wheel bases, ft. and in.:	
Driving	13—8
Engine, total	36—11
Engine and tender, total	79—5½
Driving wheels, diameter outside tires, in.	79
Cylinders, number, diameter and stroke, in.	2—25 by 28
Valve gear, type	Walschaert
Boiler:	
Steam pressure, lb.	200
Diameter, first ring, inside, in.	79½
Firebox, length, in.	108⅛
Firebox width, in	90¼
Tubes, number and diameter, in.	190—2¼
Flues, number and diameter, in.	45—5½
Length over tube sheets, ft.	21
Fuel	Bituminous coal
Grate area, sq. ft.	67.8
Heating surfaces, sq. ft.:	
Firebox	222
Arch tubes	35
Firebox, total	257
Tubes and flues	3,695
Evaporative total	3,952
Superheating	1,150
Combined evap. and superheat	5,102
Tender:	
Style	Cast-steel frame
Water capacity, U. S. gal.	15,000
Fuel capacity, tons	16
Trucks	Six-wheel

Partial List of Specialties on the Cars of the New York Central "Mercury"

Wheels	Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Truck brake; air brake and air signal	New York Air Brake Co., New York
Hand brake	National Brake Co., Buffalo, N. Y.
Bolster and truck frame wear plates	Raybestos-Manhattan, Inc., Bridgeport, Conn. Manganese Steel Forge Co., Philadelphia, Pa.
Equalizer and bolster springs	American Locomotive Co. (Railway Steel Spring Division), New York
Chrome-vanadium and silicon - vanadium alloy-steel for truck springs	Vanadium Corp. of America, Pittsburgh, Pa.
Equalizer and bolster spring pads	Fabreeka Products Co., Inc., Boston, Mass.
Draft gear and buffer gear	Waugh Equipment Co., New York
Rubber cushions (journal box)	Goodyear Tire & Rubber Co., Akron, Ohio
Couplers (tight - lock); coupler yokes; coupler carrier; coupler centering device; train-line coupler (between kitchen and dining car)	Ohio Brass Co., Mansfield, Ohio
Buffer closure (materials only)	Fabreeka Products Co., Inc., Boston, Mass. Rustless Iron Co., Baltimore, Md. United States Rubber Products, Inc., New York
Roller bearings	Timken Roller Bearing Co., Canton, Ohio
Metallic connectors	Barco Mfg. Co., Chicago
Super - Oilite bushings; Cooke brake pins; brake beams (offset)	American Steel Foundries. Chicago
Batteries:	
Cars 2, 3, 5 and 7	Electric Storage Battery Co., Philadelphia, Pa.
Cars 1, 4 and 6	Gould Storage Battery Corp., Depew, N. Y.
Generator drive	Spicer Mfg. Corp., Toledo, Ohio
Switches; lamp sockets	Bryant Electric Co., Bridgeport, Conn.
Switches; service outlets; lamps	General Electric Co., Schenectady, N. Y.
Switches	Harvey Hubbell, Inc., Bridgeport, Conn.
Lighting fixtures; conduit fittings	Crouse-Hinds Co., Syracuse, N. Y.
Lighting fixtures; lamp sockets	Dayton Mfg. Co., Dayton, Ohio
Lighting fixtures; generators; voltage control; lamp sockets	Safety Car Heating & Lighting Co., New York
Lighting fixtures	Luminator, Inc., Chicago
Lamps	General Electric Co., Nela Park, Cleveland, Ohio
Lamp socket supports	Worcester Pressed Steel Co., Worcester, Mass.
Translucent lamp shades	Formica Insulation Co., Cincinnati, Ohio
Circuit breaker (De-Ion)	Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.
Annunciators; push buttons	Stanley & Patterson, New York
Plug-in receptacles (under car and plugs)	Pyle-National Co., Chicago Albert & J. M. Anderson Mfg. Co., Boston, Mass.
Back-up and marker lights (mechanism)	Pyle-National Co., Chicago
Photo-electric relay for door control	Stanley Works, New Britain, Conn.
Exhaust fans	Diehl Mfg. Co., Elizabethport, N. J. American Machine & Metals Mfg. Corp., (De Bothezat Corp.), New York
Air filters	American Air Filter Co., Louisville, Ky. American Radiator Co., New York
Air conditioning	Frigidaire Corp., Dayton, Ohio



Air-Conditioning Compressor and Condenser Installation Under One of the Cars

Grilles and registers	Hart & Cooley Mfg. Co., Chicago, Ill.
Steam heat; temperature control panel	Vapor Car Heating Co., Chicago, Ill.
Steam-pipe covering	Union Asbestos & Rubber Co., Chicago, Ill.
Flooring; insulation	Armstrong Cork Products Co., Lancaster, Pa. Johns-Manville Corp., New York
Flooring (kitchen and pantry only)	Aluminum Co. of America, Pittsburgh, Pa.
Floor covering (rubber tile)	David E. Kennedy, Inc., Brooklyn, N. Y.
Carpet	Mohawk Carpet Mills, Inc., Amsterdam, N. Y.
Rubber carpet cushion	United States Rubber Products Co., Inc., New York Midgley & Borrowdale, Chicago
Stainless steel in kitchen	Republic Steel Corp., Youngstown, Ohio
Kitchen equipment (pots, pans, etc.)	Lalance & Grosjean Corp., Woodhaven, L. I., N. Y.
Copper tubing and sweated fittings for water supply	Chase Brass & Copper Co., Inc., Waterbury, Conn.
Vestibule steps	Alan Wood Steel Co., Conshohocken, Pa.
Trap doors and step mechanisms; window sash and fixtures	O. M. Edwards Co., Syracuse, N. Y.
Interior and exterior doors	Jamestown Metal Corp., Jamestown, N. Y.
Door fittings	Yale & Towne Mfg. Co., Stamford, Conn. Soss Mfg. Co., Roselle, N. J. Dayton Mfg. Co., Dayton, Ohio
Venetian blinds	Simon Ventilighter Co., New York
Vestibule curtains and fixtures; window curtains and fixtures	Pantasote Co., Inc., New York Adams & Westlake Co., Chicago, Ill.
Dining-car chairs	General Fireproofing Co., Youngstown, Ohio
Loose chairs and built-in seats	Lincoln Chair Co., Columbus, Ind.
Coach seats	Coach & Car Equipment Co., Chicago
Seat and chair coverings	L. C. Chase & Co., New York Shelton Looms (Sidney Blumenthal & Co.), New York Wm. Wiese & Co., New York Cleveland Tanning Co., Cleveland, Ohio Eagle Ottowa Leather Co., Grand Haven, Mich.
Head rest covers	Orinoka Mills, New York
Table tops	Formica Insulation Co., Cincinnati, Ohio Haskelite Mfg. Corp., Chicago, Ill. Midgley & Borrowdale, Chicago, Ill. Armstrong Cork Products Co., Lancaster, Pa.
Shelving	Formica Insulation Co., Cincinnati, Ohio
Tables	Lincoln Chair Co., Columbus, Ind. Dayton Mfg. Co., Dayton, Ohio
Water coolers	Henry Giessel Co., Chicago
Bar	Brunswick-Balke-Collender Co., Chicago, Ill.
Interior finish	David E. Kennedy, Inc., Brooklyn, N. Y. Pantasote Co., Inc., New York Aluminum Co. of America, Pittsburgh, Pa.
Paint, interior and exterior	Sherwin-Williams Co., Cleveland, Ohio
Tekko and Salubra wall covering	Frederick Blank & Co., New York
Flexwood	United States Plywood Co., Inc., New York
Lavatories and hoppers; tables; table fittings; paper holders; interior fittings (saloons and lavoratories)	Dayton Mfg. Co., Dayton, Ohio
Mirrors	Semon-Bache & Co., New York
Plate glass	Libbey-Owens Ford Glass Co., Toledo, Ohio
Prismatic glass	Pressed Prism Plate Glass Co., Chicago, Ill.
Bent glass for rear end sign	Regal Art Co., Chicago, Ill.
Anti-pinch shields	Morton Mfg. Co., Chicago, Ill.

for changing colors. The rear sign is lighted by seven 25-watt lamps, arranged in two rows.

Circuit breakers are used to protect and control lighting circuits. Toggle switches are used for individual lights. Door switches are used in lockers having lights and in refrigerators.

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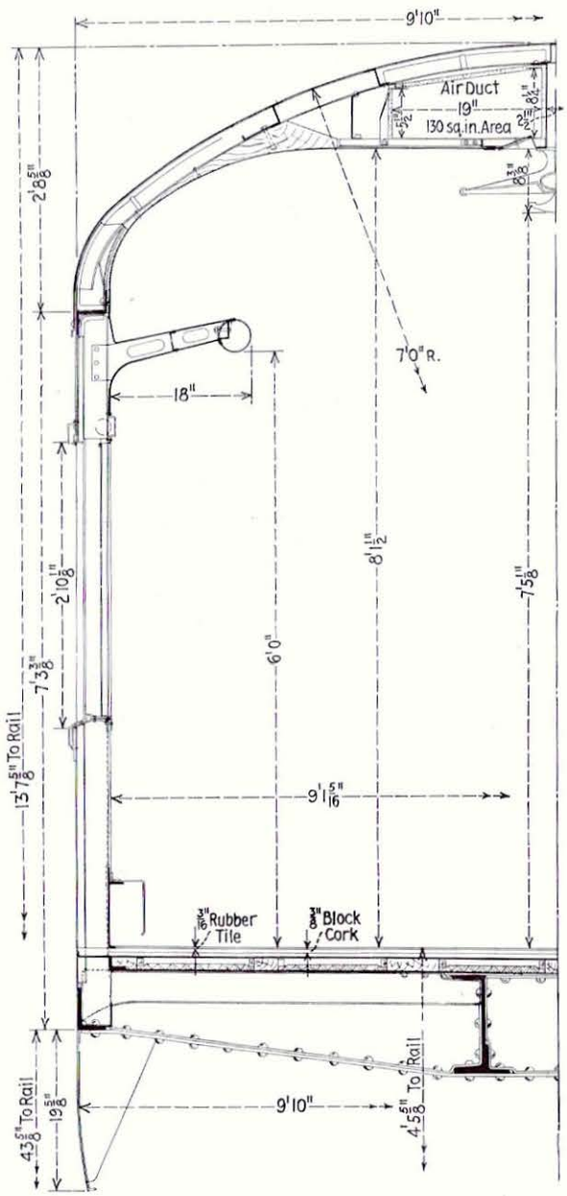
Air distribution has been worked out, so that ducts and other passages are concealed and combined with lighting fixtures, in such a way as to provide the desired circulation without interference with the interior appearance or decoration scheme. Exhaust fans are provided, one in each of the toilets and the smoking rooms in the passenger baggage car and coach; the compartment in the parlor car, the stewards section and the regulator locker of the dining car and the pantry of the kitchen coach. Two are provided in the kitchen of the kitchen coach and the observation section of the parlor-observation car. These fans insure proper ventilation without permitting the infiltration of outside air. Two motor-driven blowers supply draft for the range.

Other motor-driven equipment includes a kitchen mixer with accessories, including a juice extractor used in the kitchen and a drink mixer used at the bar.



A Half-Section through One of the Coaches

Power Supply

Each car is equipped with a 20-kw., 80-volt, body-hung generator, driven from an axle through a Spicer positive gear drive having a ratio of 2.54:1. There are two 16-cell, 600-amp.hr. lead batteries, connected in series, per car. Standby power can be received both as 220-volt, three-phase, a.c. power for operating the com-

are placed at vantage points in terminals for the information of enginemen.

Brake Equipment

Constant improvement is being made in the design and effectiveness of brake equipment on cars and locomotives. An examination of the speed recorders of one of the new high speed trains shows that at speeds of 100 m.p.h., the train can be brought to a stop with a service application within a distance of slightly less than one mile; and with an emergency application, within a distance of slightly less than three-quarters of a mile.

Speed Limitations on Curves of Various Degrees

Name of Railroad	Train Speeds on Curves of: Maximum	1 deg.	2 deg.	3 deg.	Super-Elevation on Curves of: 1 deg. in.	2 deg. in.	3 deg. in.	Length of Spirals on Approach of: 1 deg. ft.	2 deg. ft.	3 deg. ft.	Weight of Rail: Minimum lb.	Maximum lb.	Predominating lb.
Milwaukee	100	90	70	60	3½	3¾	4¼	310	390	312	90	131	100
C. & N. W.	95	85	75	60	3	6	6	280	400	350	100	112	100
Alton	70	70	70	65	3	6	6	234	468	468	90	112	90
Missouri Pacific	65	65	65	55	2	4	6	100	200	300	90	112	90
Illinois Central	85	85	70	60	3	5	5	300	400	400	90	112	90
C. & E. I.	80	80	80	60	3¼	6	6	195	360	360	90	112	90
C. B. & Q.	90	90	85	65	3	5	5	100	300	300	90	112	90 & 100
N. Y., N. H. & H.	70	70	70	60	3	5	6	248	412	496	107	130	107

Automatic Block Signals—Highway Crossing Signals

The type of signal used—semaphore, color light, four aspect or cab signal—is not important, as the final result is the same. The so-called "stopping distance" is the answer to this important question and this means no more and no less than the distance between the first signal giving a restrictive indication and the stop signal. It must be of sufficient length so that if the brakes are not applied until the train passes the first restrictive signal, it can and will be brought to a stop before it reaches the stop signal.

With trains of new construction and maximum braking power, operating at speeds up to 100 miles an hour, a distance of 7,500 ft. between such signals appears to be desirable. Here again, however, local physical characteristics such as grades and curvatures are involved. In some territories lesser distances may be practicable, whereas, in others increased distances may not only be practicable but desirable. Cab signals provide a greater margin of safety than way-side signals, especially in bad weather, but do not in any respect shorten the so-called "stopping distance" required for safe operation.

The increased speed of trains has brought further problems at highway crossings, not only at those that are unprotected, but at crossings that are protected as well. On railroads where trains are operated at very high and also at very low speeds, we are confronted with situations whereby motorists, in the case of slow moving trains, take chances and invite accidents as a result. The extension of track circuits is necessary but time-controlled crossing signals are also a factor in solving this problem. Most railroads operating high speed trains have increased the length of their highway crossing circuits 50 per cent, and while one railroad has circuits extending 3,800 ft. from a crossing, most generally a distance of 3,000 ft. is being used, and that appears to be the proper one.

In some states a progressive program is now under way to install electric signals at unprotected crossings, appropriation being made for and the work being done at crossings in the order of their importance with relation to the density of traffic and the extent of the hazard. This expenditure for construction is being borne by the federal and state governments—maintenance by the railroads.

Interlocking plant annunciator circuits, warning signalmen of the approach of trains to permit the change of routes and avoid train delays, have been increased to approximately two and one-half miles, and on some railroads to as much as four miles.

Train Operation

Strict enforcement by managements and willing compliance by employees of the rules is the answer to safe, efficient operation of a railroad. The general application of the rules properly provides for the safe operation of high speeds trains, with a few changes here and there by various railroads. Some roads require five minutes clearance time by inferior trains, others have increased this to 10 minutes, and still others to as much as 15 minutes for movements in the same direction; for opposing movements on single track with trains of the same class, meeting points are invariably made by train order, except in centralized traffic control territory.

Track imperfections, or other conditions affecting the track or bridges, which require a reduction in the speed of trains, are a most serious problem and must be dealt with as such. If there is sufficient time to notify the train involved in the usual manner, i.e., by train order, the situation is well in hand, but in the case of a broken rail, a damaged switch or joint, or any other condition making normal speed unsafe, the responsibility for warning an approaching train must be assumed largely by the track forces. Slow flags must be provided and the distance from the point of slow track to where the slow flags are placed must be sufficient to insure full protection. Practices in effect on various roads in this respect differ to a considerable extent, but it is the opinion of this committee that such distances should be not less than one mile and be further increased where necessary. In the event that the track is found impassable, a trackman equipped with proper signals must be provided while distances should be the same, and further increased if conditions warrant.

Schedules

Inauguration of a new schedule for a high speed train is a laborious and exacting task. Operating a train long distances at an average speed over-all of more than 60 miles an hour requires the elimination of delays that were formerly commonplace and even thought necessary, as for example, the relocation of water and fuel stations, increasing pipe diameters at water stations to permit the faster flow of water, changes in curves, the elimination of mail and express lading for intermediate points, etc. The handling of mail and express has always been a source of vexatious train delay to passengers, and if possible should be eliminated from high speed train operation. On-time performance is essential if the public is to be impressed with the service and satisfied to the extent of future patronage; this brings forth more problems. Such a schedule is not easy to maintain under the most favorable circumstances; it becomes more difficult when unforeseen obstacles present themselves. Careful planning and scheming will in many cases solve the problem. On one railroad operating high speed trains at sustained speeds of 90 m.p.h. the construction of an 80-ft. highway necessitated an underpass of the same width under a double-track line. The work had been so planned and has so progressed that within a period of 21 days, 160 piling of 40-ft. lengths were driven and the falsework of the structure completed without any reduction in the speed of the fast train.

The report concluded with figures of the cost of operation of high-speed trains, which have been published previously in the *Railway Age*.

B. T. Anderson's Address

Bearing on the same general subject as the committee report, Burt T. Anderson, director of the Bureau of Railway Signaling Economics, presented a paper on signaling for High-Speed Train Operation, which paper was discussed by C. A. Taylor, superintendent of tele-

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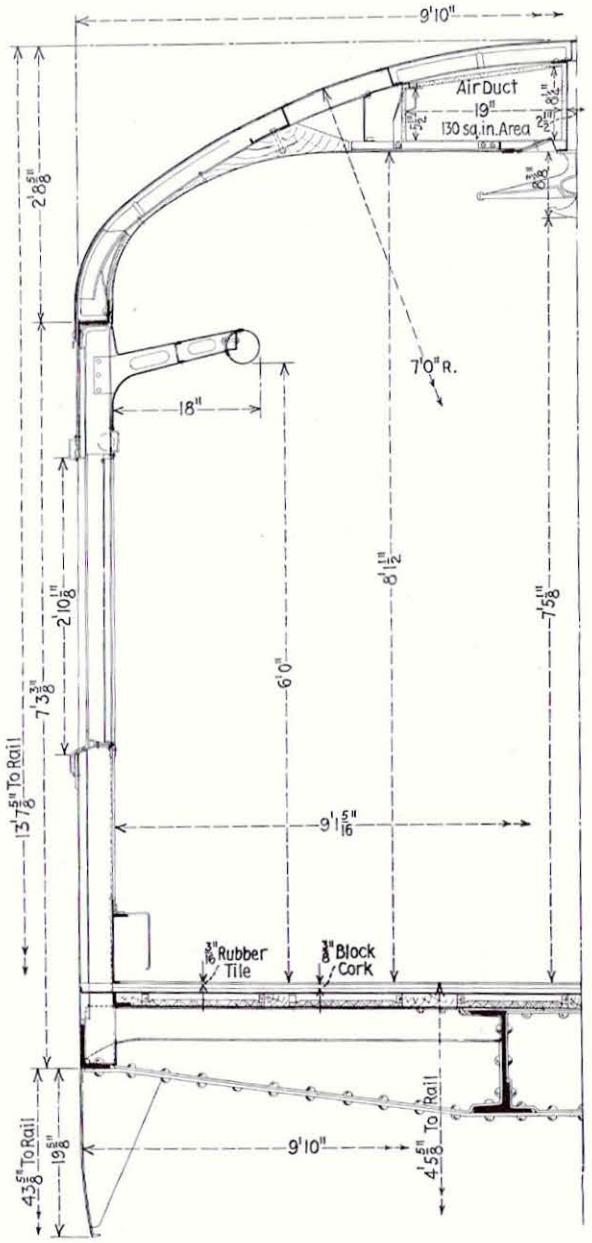

A Half-Section through One of the Coaches

Power Supply

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pressor motors and as 80-volt, direct-current power for charging batteries. There are two d.c. and two a.c. receptacles on each car, one set on each side.

Telephone facilities are provided in the lounge car and in the parlor-observation car. These consist of a ringer box and jack, which can be used for making connections with regular telephone lines at terminals. Both parlor cars are equipped with annunciator systems.

The Locomotive

The locomotive, which by its streamlining and decoration is an integral part of the train, is a K5 Pacific type locomotive of a design developed in 1926. It develops a maximum tractive force of 37,600 lb. The cylinders are 25 in. in diameter by 28 in. stroke; the driving wheels, 79 in. in diameter, and the boiler pressure, 200 lb.

This locomotive was refitted at the West Albany shops, at which time the drivers were replaced with wheels of the Boxpok type, and the entire locomotive and tender fitted with a streamline cowling to harmonize with the exterior of the coaches. The driving-wheel centers have been painted in aluminum. A band of black separates the central aluminum discs from the aluminum finished rim and tire.

The lighting on the running gear of the locomotive is supplied by three 50-watt and two 15-watt lamps on either side, located under the cowling immediately above the driving wheels. The 50-watt lamps are placed in step-light reflectors. The headlight is a standard 250-watt unit and a 100-watt lamp is used in the back-up light. This light and the running-gear lights are controlled by a two-way switch so that both cannot be operated together. Power is supplied by a 32-volt, 1,000-watt turbine-driven generator.

Other items of the locomotive equipment and the principal dimensions of the locomotive are given in tables accompanying the text.

Partial List of Specialties on the Locomotive of the New York Central "Mercury"

Steel plates (new) and steel sheets for shrouding	Joseph T. Ryerson & Son, Chicago, Ill.
Crosshead shoes	Hunt-Spiller Mfg. Corp., Boston, Mass.
Driving-box wedge compensator	Franklin Railway Supply Co., New York
Wheel centers, driving	General Steel Castings Co., Eddystone, Pa.
Wheel centers, trailing	Scullin Steel Co., St. Louis, Mo.
Bearings, roller, engine, trailer, tender trucks	Timken Roller Bearings Co., Canton, Ohio
Brick arch	General Refractories Co., Philadelphia
Firedoor	Franklin Railway Supply Co., New York
Grates	Waugh Equipment Co., New York
Stoker, HT	Standard Stoker Co., New York
Feedwater heater, Elesco centrifugal pump	Superheater Co., New York
Power reverse, Precision	Franklin Railway Supply Co., New York
Sanders	Graham-White Sander Corp., Roanoke, Va.
Coupler, rear of tender (Tight-Lock)	Ohio Brass Co., Mansfield, Ohio
Coupler, drop	General Steel Castings Co., Eddystone, Pa.
Flexible pipe connections	Barco Mfg. Co., Chicago, Ill.
Tender draft gear	Waugh Equipment Co., New York
Air brakes	New York Air Brake Co., New York
Safety valves	Consolidated Ashcroft-Hancock Co., Bridgeport, Conn.
Turbo generator	Pyle-National Co., Chicago
Headlights	Pyle-National Co., Chicago
Lubricators, force feed	Nathan Mfg. Co., New York
Injector	Nathan Mfg. Co., New York
Cylinder and valve bushings and bull rings	Hunt-Spiller Mfg. Corp., Boston, Mass.
Cylinder and valve packing	Hunt-Spiller Mfg. Corp., Boston, Mass.
Piston rod and valve stem packing	United States Metallic Packing Co., Philadelphia, Pa.
Low water alarm	Barco Mfg. Co., Chicago
Air whistle	Leslie Co., Lyndhurst, N. J.
Bell ringer	Transportation Devices Corp., Indianapolis, Ind.
Train control	General Railway Signal Co., Rochester, N.Y.
Continuous blow-down	National Aluminate Corp., Chicago
Steam driers	Dri-Steam Valve Corp., New York
Throttle, multiple	American Throttle Co., New York
Painting	Sherwin Williams Co., Cleveland, Ohio
Valve pilot	Valve Pilot Corp., New York

Railroad Week Well Organized

NEW and unusual features will mark the celebration of the second annual Railroad Week to be held by the western railroads during the week of July 13 to 18. An organization of 500 committees has been set up to supervise and arrange activities in as many cities, and the programs already arranged forecast greater interest on the part of the public than was displayed last year.

Typical of these is that for Chicago, where the outstanding features will be a contest among girl railroad employees throughout the west for the "Queen of Queens," a dot and dash pow wow, a handcar derby, a redcap race and a giant parade. The program in detail is as follows:

Monday—July 13

8 a. m.—Mighty chorus of 18,000 railroad whistles signalizing start of Railroad Week throughout the west.

10 a. m.—Breakfast-luncheon at the Medinah Club of Chicago, sponsored by the Chicago Association of Commerce, the Traffic Club of Chicago, the Junior Association of Commerce and the Junior Traffic Club of Chicago, at which the keynote Railroad Week address will be given by Harry Guy Taylor, chairman of the Western Association of Railway Executives, and the "Queen of Queens" review featuring a bevy of beautiful railroad girl employees sent from throughout the west competing for the selection of Railroad Week queen will be staged.

12 noon—Public crowning of "Queen of Queens" at State and Madison Streets by Mayor Edward J. Kelly of Chicago.

8 p. m.—Two huge Railroad Week dances to be held at the Trianon and Aragon ballrooms at which the "Queen of Queens" and her court will appear together with numerous railroad presidents and other officers.

Tuesday—July 14

12 noon—Rotary club Railroad Week luncheon at the Sherman Hotel, where the principal speaker will be John J. Pelley, president of the Association of American Railroads. The chairman of the luncheon will be Harry Guy Taylor, and the entertainment will be furnished by the Chicago and Northwestern Choral Club.

2:30 p. m.—Railroad day at Cubs' Ball Park, where a train crier's contest will be staged on the baseball diamond prior to the calling of the game, with railroad officers, beauty queens and others in attendance.

Wednesday—July 15

12 noon—Association of Commerce Railroad Week luncheon at the Palmer House, where the principal speaker will be Judge R. V. Fletcher, vice-president and general counsel of the Association of American Railroads, and where prominent railroad executives who at one time were telegraph operators will man keys in a circuit directly connected with numerous other coincident Chamber of Commerce luncheons.

3 p. m.—A giant 23,000-mile dot and dash pow wow operated by the Western Union Telegraph Company, with outlets in hundreds of towns and cities throughout the western area. This pow wow will be conducted with prominent rail officers manning the keys.

Thursday—July 16

7 p. m.—Dinner at the Medinah Club of Chicago, sponsored by the Railway Business Woman's Club and the Woman's Traffic Club of Chicago, where the principal speaker will be Judge R. V. Fletcher, and a style show will be given, using Railroad Week queen contestants as mannequins.

Friday—July 17

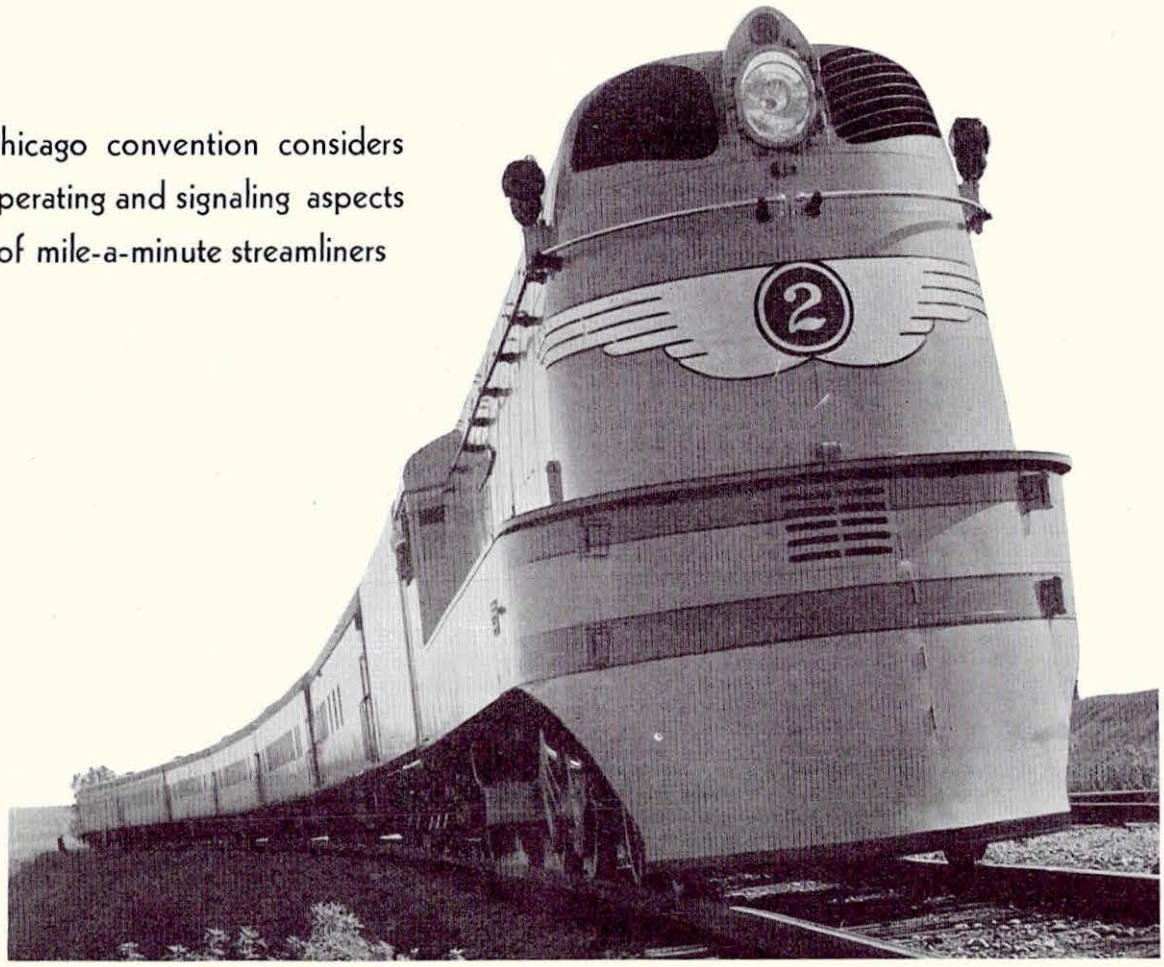
12 noon—A handcar derby over street car tracks on Franklin Street, starting north of Madison Street and extending to the Merchandise Mart.

12:30 p. m.—A redcap's race over the ramp in front of the

(*Continued on page 75*)

Superintendents Discuss High-Speed Passenger Trains

Chicago convention considers operating and signaling aspects of mile-a-minute streamliners



High-Speed Train Operation Means New Problems for Superintendents

THE operating and signaling aspects of high-speed passenger train operation were discussed at length at the convention of the American Association of Railroad Superintendents in Chicago on June 16. This subject was presented in a committee report prepared by J. H. Valentine, superintendent, C. M. St. P. & P., and in addresses by Burt T. Anderson, director, Bureau of Railway Signaling Economics, and C. A. Taylor, superintendent of telegraph and signals, C. & O.

Report of the Committee

The report of the committee is abstracted below:

The high-speed train of Diesel, steam, electric, lightweight, or semi-lightweight design appears to offer at least one method by which the railroads may recapture some of the passenger travel, and during the past year a number of such trains of various types and designs have been built and placed in service, with top speeds of 80 to 100 m.p.h. From a division superintendent's standpoint, there are four cardinal principles upon which rest the safe, comfortable and satisfactory operation of such trains.

The outward thrust of a train traveling over a curved track increases with the speed of the train. Exceptionally heavy rail is not a requisite, as most of the present high speed trains tend toward lighter than standard construction. Curves have been reduced to a considerable extent on some railroads and this work is still under way; some roads have done little work of this character and others none at all. A great deal has been done by many of these roads in the revision of super-elevation and length of spirals to overcome the increased centrifugal force developed by increased speed. The accompanying table shows the varying standards of super-elevation and of lengths of spirals, at the same speeds, on different railroads. While this variation may seem inconsistent, it must be recalled that the type of train, the height of the center of gravity, and variations in other traffic, must all be given consideration.

The problem becomes more complicated where freight trains are operated on the same tracks. Constant studies of this matter by engineering officers are necessary, and changes must be made to conform with train speeds. Definite formulae may be used as a basis, but because of differing conditions the problem is largely one for solution by individual railroads. As an example, the "Hiawatha" of the Milwaukee negotiates one-degree curves with 3½-in. super-elevation and 310-ft. spirals at 90 miles an hour with the utmost in riding comfort. Speed signs or boards, which specify in figures the maximum speeds permitted, are placed at definite locations, generally 3,000 ft. from the point of curve; in addition, profiles of the territory over which the trains operate, showing the location of the speed signs,

are placed at vantage points in terminals for the information of enginemen.

Brake Equipment

Constant improvement is being made in the design and effectiveness of brake equipment on cars and locomotives. An examination of the speed recorders of one of the new high speed trains shows that at speeds of 100 m.p.h., the train can be brought to a stop with a service application within a distance of slightly less than one mile; and with an emergency application, within a distance of slightly less than three-quarters of a mile.

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The type of signal used—semaphore, color light, four aspect or cab signal—is not important, as the final result is the same. The so-called "stopping distance" is the answer to this important question and this means no more and no less than the distance between the first signal giving a restrictive indication and the stop signal. It must be of sufficient length so that if the brakes are not applied until the train passes the first restrictive signal, it can and will be brought to a stop before it reaches the stop signal.

With trains of new construction and maximum braking power, operating at speeds up to 100 miles an hour, a distance of 7,500 ft. between such signals appears to be desirable. Here again, however, local physical characteristics such as grades and curvatures are involved. In some territories lesser distances may be practicable, whereas, in others increased distances may not only be practicable but desirable. Cab signals provide a greater margin of safety than way-side signals, especially in bad weather, but do not in any respect shorten the so-called "stopping distance" required for safe operation.

The increased speed of trains has brought further problems at highway crossings, not only at those that are unprotected, but at crossings that are protected as well. On railroads where trains are operated at very high and also at very low speeds, we are confronted with situations whereby motorists, in the case of slow moving trains, take chances and invite accidents as a result. The extension of track circuits is necessary but time-controlled crossing signals are also a factor in solving this problem. Most railroads operating high speed trains have increased the length of their highway crossing circuits 50 per cent, and while one railroad has circuits extending 3,800 ft. from a crossing, most generally a distance of 3,000 ft. is being used, and that appears to be the proper one.

In some states a progressive program is now under way to install electric signals at unprotected crossings, appropriation being made for and the work being done at crossings in the order of their importance with relation to the density of traffic and the extent of the hazard. This expenditure for construction is being borne by the federal and state governments—maintenance by the railroads.

Interlocking plant annunciator circuits, warning signalmen of the approach of trains to permit the change of routes and avoid train delays, have been increased to approximately two and one-half miles, and on some railroads to as much as four miles.

Train Operation

Strict enforcement by managements and willing compliance by employees of the rules is the answer to safe, efficient operation of a railroad. The general application of the rules properly provides for the safe operation of high speeds trains, with a few changes here and there by various railroads. Some roads require five minutes clearance time by inferior trains, others have increased this to 10 minutes, and still others to as much as 15 minutes for movements in the same direction; for opposing movements on single track with trains of the same class, meeting points are invariably made by train order, except in centralized traffic control territory.

Track imperfections, or other conditions affecting the track or bridges, which require a reduction in the speed of trains, are a most serious problem and must be dealt with as such. If there is sufficient time to notify the train involved in the usual manner, i.e., by train order, the situation is well in hand, but in the case of a broken rail, a damaged switch or joint, or any other condition making normal speed unsafe, the responsibility for warning an approaching train must be assumed largely by the track forces. Slow flags must be provided and the distance from the point of slow track to where the slow flags are placed must be sufficient to insure full protection. Practices in effect on various roads in this respect differ to a considerable extent, but it is the opinion of this committee that such distances should be not less than one mile and be further increased where necessary. In the event that the track is found impassable, a trackman equipped with proper signals must be provided while distances should be the same, and further increased if conditions warrant.

Speed Limitations on Curves of Various Degrees

Name of Railroad	Train Speeds on Curves of: Maximum	1 deg.	2 deg.	3 deg.	Super-Elevation on Curves of: 1 deg. in.	2 deg. in.	3 deg. in.	Length of Spirals on Approach of: 1 deg. ft.	2 deg. ft.	3 deg. ft.	Weight of Rail: Minimum lb.	Maximum lb.	Predominating lb.
Milwaukee	100	90	70	60	3½	3¾	4¼	310	390	312	90	131	100
C. & N. W.	95	85	75	60	3	6	6	280	400	350	100	112	100
Alton	70	70	70	65	3	6	6	234	468	468	90	112	90
Missouri Pacific	65	65	65	55	2	4	6	100	200	300	90	112	90
Illinois Central	85	85	70	60	3	5	5	300	400	400	90	112	90
C. & E. I.	80	80	80	60	3¼	6	6	195	360	360	90	112	90
C. B. & Q.	90	90	85	65	3	5	5	100	300	300	90	112	90 & 100
N. Y., N. H. & H.	70	70	70	60	3	5	6	248	412	496	107	130	107

Schedules

Inauguration of a new schedule for a high speed train is a laborious and exacting task. Operating a train long distances at an average speed over-all of more than 60 miles an hour requires the elimination of delays that were formerly commonplace and even thought necessary, as for example, the relocation of water and fuel stations, increasing pipe diameters at water stations to permit the faster flow of water, changes in curves, the elimination of mail and express lading for intermediate points, etc. The handling of mail and express has always been a source of vexatious train delay to passengers, and if possible should be eliminated from high speed train operation. On-time performance is essential if the public is to be impressed with the service and satisfied to the extent of future patronage; this brings forth more problems. Such a schedule is not easy to maintain under the most favorable circumstances; it becomes more difficult when unforeseen obstacles present themselves. Careful planning and scheming will in many cases solve the problem. On one railroad operating high speed trains at sustained speeds of 90 m.p.h. the construction of an 80-ft. highway necessitated an underpass of the same width under a double-track line. The work had been so planned and has so progressed that within a period of 21 days, 160 piling of 40-ft. lengths were driven and the falsework of the structure completed without any reduction in the speed of the fast train.

The report concluded with figures of the cost of operation of high-speed trains, which have been published previously in the *Railway Age*.

B. T. Anderson's Address

Bearing on the same general subject as the committee report, Burt T. Anderson, director of the Bureau of Railway Signaling Economics, presented a paper on signaling for High-Speed Train Operation, which paper was discussed by C. A. Taylor, superintendent of tele-

graph and signals of the Chesapeake & Ohio. An abstract of Mr. Anderson's paper follows:

The advance in scheduled high-speed train service in this country in the last five years is without parallel in the world. From about 30 regular runs in 1930 timed at 60 m.p.h. and over, the number at the end of 1935 had increased to over 400, while the mileage had increased from about 1,100 to over 19,000. Record scheduled speeds of 88.9 m.p.h. for 41.5 miles on the Chicago, Milwaukee, St. Paul & Pacific's Hiawatha; 75.6 m.p.h. for 40.3 miles on the Pennsylvania's Union; 74.5 m.p.h. for 54.6 miles on the Chicago, Burlington & Quincy's St. Paul Zephyrs; and 65.5 m.p.h. for 1,048 miles on the Union Pacific's Streamliner, City of Denver, the fastest in the world for distances of 800 miles or more, indicate a few of the high-speed trains on regular runs.

A survey made of 43 high-speed passenger train routes shows that of the 30,000 route miles in operation, the block system is used on 29,000 miles, or about 97 per cent of the territory. Automatic train control, including train stop and speed control, is in operation on about 7,000 miles, while continuous cab signals are used on about 6,000 miles, a total of 9,300 miles of the two devices. In addition, about 400 miles are equipped with centralized traffic control, while trains are operated by signal indication without superiority of trains on about 2,000 miles.

Stopping Distance

The operation of passenger and freight trains safely at high speed is contingent upon the ability to stop them within reasonable distances. As the energy to be dissipated in a stop varies directly with the weight of the train and with the square of the speed, it is readily apparent that while this problem has been given more attention with the advent of the streamlined train, actually it is the high-speed freight train which requires the longer stopping distance, as not only the speed but also the length and weight of these trains have been increased. Years ago when trains were operated at average speeds of 20 to 40 m.p.h., the block lengths varied from 2,500 to 5,000 ft., but as the speeds were increased to 80 to 100 m.p.h. for passenger trains and 50 to 60 m.p.h. for freight trains, the block lengths were increased to 4,000 to 8,000 ft. In one case, braking tests showed that signals properly spaced for existing 70-mile speeds of standard 15-car trains would require little change for a 5- or 7-car train operating 90 m.p.h.

Multiple-Block Signaling

Generally the increased stopping distance has been provided by relocating the signals, eliminating alternate signals or increasing the number of restrictive indications. The signal changes which merely involve the increase of block lengths are adequate for the provision of safety for the new high-speed trains, but they must not impose too great a burden upon the operation of the lower speed passenger and freight trains which are often the source of the largest part of the railroad's revenue. Where trains of widely varying ranges of speed are operated over the same tracks, the signal system should be so designed that each class of train may be moved on as close headway as the stopping distance and safe operating conditions will permit.

For example, assume a track layout with the signals 1.5 miles apart and giving three indications: "Stop," "Approach," and "Proceed." If they are to run on clear signals, the trains must keep at least three miles apart. In order to provide for increased stopping distance, let us assume the elimination of every second signal which results in the signals being three miles apart, requiring trains to operate six miles apart when running under clear signals. The time spacing of 100 m.p.h. trains would then be 3.6 min. apart, 60 m.p.h. trains would be 6 min. apart, 45 m.p.h. trains would be 9 min. apart and 20 m.p.h. trains would be 18 min. apart.

Obviously, if there are many trains operating in the 20 to 45 m.p.h. class, the elimination of alternate signals in order to obtain stopping distance for a few high-speed trains very materially reduces the capacity of the line. Also, the stopping distance obtained by eliminating alternate signals would be more than that required by the high-speed trains. The real solution in the majority of cases is to increase the number of restrictive indications by going to three- or four-block signaling as required by local operating conditions. The adoption of shorter blocks and multiple indications in heavily congested terminal and yard areas on many railroads where traffic moves at varying speeds has proven of decided advantage in relieving congestion and expediting traffic in an economical manner.

Centralized Traffic Control

The operation of high-speed passenger trains at cruising speeds of 90 to 100 m.p.h. in order to meet schedules of 60 to 70 m.p.h., including intermediate stops, and high-speed freight trains with schedules of 35 to 45 m.p.h., demands not only the most modern locomotives, equipment and roadway, but also the most modern signaling. It is necessary to direct train movements with the least possible delay such as is possible only with centralized traffic control whereby train movements are directed by signal indications without the superiority of trains. Delays due to meets and passes with other trains must be reduced to a minimum. Trains must be diverted from one track to another over long crossovers at authorized speed protected with power interlockings and modern signaling.

The long record of centralized traffic control in eliminating delays, expediting traffic, increasing the G.T.M. per train-hour, and reducing the cost of transportation while increasing the safety of train operation, marks it as one of the greatest developments in expediting train movements in the past 25 years. Centralized traffic control is the most efficient and effective method of dispatching trains, providing frequent and immediate "OS" information as to train movements and aiding the supervision of train movements—a very important factor in high-speed operation. It provides for instantly changing meeting and passing points, making possible a percentage of non-stop meets varying from 50 to 90 per cent, aiding the operation of slower trains, and facilitating train operation during peak movements—in short, providing maximum track capacity. It eliminates auxiliary signals and increases safety because there is less possibility of misinterpreting signal indications when instructions governing the movement of trains are given by signal indications displayed at the points where action is required. It conserves capital by making possible a greater use of existing facilities at lower cost. Studies on several railways have shown that trackage could be eliminated and better performance secured with C.T.C. than with the existing facilities.

Centralized traffic control is designed to facilitate safe high-speed train operation by providing means for the more efficient direction of train movements and becomes increasingly important as more high-speed trains are placed in operation. It is a method of operation which is providing increased transportation efficiency, and as such merits greater consideration by the operating officers interested in the modern developments in the railway industry.

Discussion by C. A. Taylor

In discussing Mr. Anderson's paper, C. A. Taylor (Supt., Tel. & Sig., C. & O.) explained the need for certain additional signal aspects in expediting train movements, his remarks in abstract being as follows:

The simplest form of automatic block signaling is the two-block, three-indication system in which the "Proceed" indication (green) means "Proceed at authorized speed." This indication could not be given on the signal approaching an interlocking plant if a diverting movement were to be made through a so-called medium speed turnout or crossover. Therefore, in order to avoid the necessity of a train that is to be diverted having to approach the interlocking plant prepared to stop, an additional aspect was developed, the name of which is given in the Standard Code as "Approach Medium" (yellow over green), the indication being "Approach next signal at not exceeding medium speed." This additional aspect has proved to be of considerable benefit in expediting train movements through so-called medium speed turnouts and crossovers, as the engineman is given advance information as to the speed at which he may approach the interlocking plant.

It was soon found that at certain locations the use of this two-block, three-indication system resulted in delays to trains where close following movements were being made on account of the long block spacing, and as a result the three-block, four-indication system was developed. With this system the engineman knew when receiving a clear indication that there were at least three blocks clear in advance of his train and when receiv-

ing the indication "Approach next signal at not exceeding medium speed" (yellow over green), he knew that there were at least two blocks clear. With this system the blocks could be made somewhat shorter than under the two-block system, which would allow the trains to follow one another with less time interval and at the same time with safety.

With the inauguration of high-speed passenger trains, it was found that in many instances that in order to provide proper braking distance, it was necessary to lengthen the block sections or in some cases, depending upon local conditions, to increase the number of signal aspects and indications. It was also found that in some of the terminal territories where traffic was getting rather congested and delays were being experienced, a four-block, five-indication signal system could be devised to eliminate the congestion and avoid the necessity of spending large sums of money to increase the number of main tracks. High-speed crossovers have also been installed recently so that diverting movements can be made without having to reduce the speed of trains to the extent that has been necessary through the so-called medium speed crossovers. In order that these additional high speeds may be made, some type of additional aspect and indication must be given to the engineman a sufficient distance in advance of the crossover so that he may be able to operate his train safely and with a minimum amount of delay.

I have given in brief the main reason for the seemingly ever-increasing number of signal aspects and indications, for no doubt a number of operating and transportation officers feel that the signal systems are becoming more or less complicated, so far as aspects and indications are concerned. However, when considering all the information being given to the enginemen and trainmen by the wayside or cab signal systems, I believe that you will agree that in the majority of cases the aspects and indications now in use are necessary to insure trains being operated with safety at the maximum speeds allowable under various conditions. I do feel, however, that we should all bear in mind the desirability of keeping the number of aspects and indications to a minimum, consistent with the various operating conditions to be encountered, for too complicated a system would have a tendency to confuse those who are required to operate the trains and control their speed in accordance with the various aspects displayed.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended June 27 totaled 713,639 cars, an increase of 22,923 cars as compared with the previous week, and of 96,776 cars, or 15.7 per cent, as compared with the corresponding week of 1935. All commodity classifications, except coal showed increases over last year's figures, and all except ore were above the previous week. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading

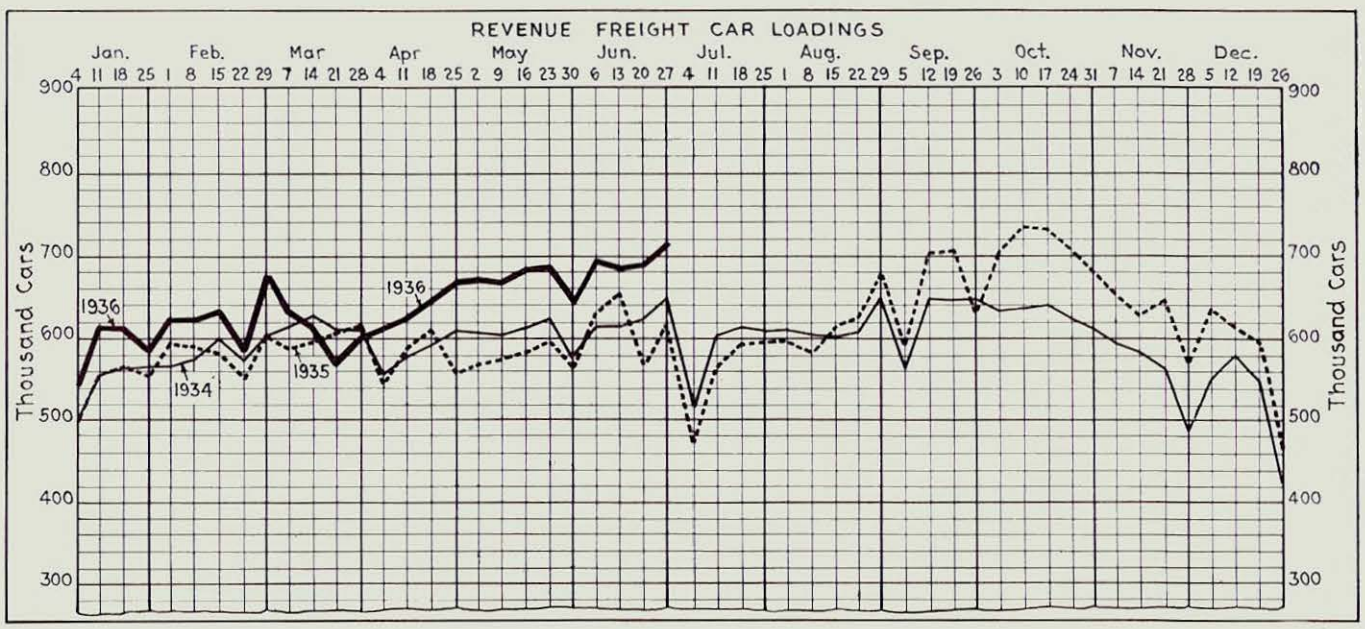
For Week Ended Saturday, June 27

Districts	1936	1935	1934
Eastern	151,716	142,153	141,958
Allegheny	140,600	126,166	128,961
Pocahontas	48,298	44,366	44,350
Southern	96,575	83,453	84,755
Northwestern	114,987	87,126	94,689
Central Western	105,606	86,219	99,955
Southwestern	55,857	47,380	51,335
Total Western Districts	276,450	220,725	245,979
Total All Roads	713,639	616,863	646,003
Commodities			
Grain and Grain Products	41,738	28,234	43,084
Live Stock	12,811	9,416	18,256
Coal	114,157	118,276	107,129
Coke	8,336	5,596	6,418
Forest Products	36,030	28,516	24,266
Ore	49,462	33,535	34,874
Merchandise L.C.L.	161,300	155,953	160,624
Miscellaneous	289,805	237,337	251,352
June 27	713,639	616,863	646,003
June 20	690,716	567,049	623,322
June 13	686,812	652,111	618,881
June 6	695,845	629,712	616,768
May 30	646,859	562,682	579,656
Cumulative Total, 26 Weeks	16,590,870	15,160,729	15,436,623

Car Loading in Canada

Car loadings in Canada for the week ended June 27 totaled to 46,909 cars, compared with 45,436 cars for the corresponding week last year and 45,740 cars for the previous week, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total For Canada:		
June 27, 1936	46,909	22,601
June 20, 1936	45,740	22,172
June 13, 1936	45,920	22,385
June 29, 1935	45,436	20,680
Cumulative Totals For Canada:		
June 27, 1936	1,125,826	611,374
June 29, 1935	1,113,985	580,407
June 30, 1934	1,094,814	602,092



Accounting Officers Hold First A.A.R. Meeting

Large attendance and program of high standard mark first gathering, at Detroit, under auspices of A.A.R.

RAILWAY accountants, members of the accounting division of the Association of American Railroads—formerly the Railway Accounting Officers Association—held a well-attended and spirited meeting in Detroit on June 30—July 2. The discussions included not only technical problems of immediate professional concern to railway accountants, but discourses of a penetrating and fundamental character on basic questions of railroad policy as well.

Among the latter were included a paper on railroad reorganizations by Robert T. Swaine of the legal firm of Cravath, de Gersdorff, Swaine & Wood; an address on public relations by Col. Robert S. Henry, chief of public relations of the Association of American Railroads; and an informal discussion of railroad policies and outlook by Judge R. V. Fletcher, vice-president and general counsel of the A.A.R. Judge Fletcher's observations, which clearly were the product not only of mature insight but of genuine depth of feeling as well, moved his hearers to frequent and prolonged applause.

Harris & Ewing

E. H. Bunnell

Blank & Stoller

F. J. Fell, Jr.

T. F. Darden

Harris & Ewing

E. R. Ford

New Officers

Under the new organization of the accounting officers, leaders of the association are no longer elected but are appointed by E. H. Bunnell, vice-president in charge of accounting of the Association of American Railroads. Under this arrangement, officers for the coming year were named as follows: Chairman, F. J. Fell, Jr., vice-president, Pennsylvania; first vice-chairman, T. F. Darden, vice-president, A.C.L.; second vice-chairman, J. W. Newell, chief accounting officer, Wabash; secretary, E. R. Ford. In making these appointments, Mr. Bunnell advanced the vice-chairmen in the same rotation as has been done heretofore by election. Attendance at the convention (the forty-seventh of the accounting officers) totaled 680—of whom 246 were accounting officers, 5 honorary members, 20 guests from government bureaus and 409 members of families and other guests.

Chairman Livengood's Report

The address of Chairman J. G. Livengood (comptroller, M-K-T) explained the new set-up of the accounting division, as well as reviewing the accomplishments of his term of office. He spoke in part as follows:

How Accounting Division Now Functions

An annual meeting was not held last year. About two years ago, in convention at White Sulphur Springs, you elected me president of the then Railway Accounting Officers Association. Shortly after induction into that office, and before we had fairly got started into our program of work for the year, advice was received from the president of the Association of American Railroads that the Railway Accounting Officers Association had been absorbed as a part of that association, although we were requested to continue directing accounting matters until further advised.

Shortly thereafter E. H. Bunnell was elected vice-president to administer the finance, accounting, taxation and valuation department—one of five departments created by the plan of organization of the A.A.R. An accounting division somewhat similar to other divisions of the association was established, the organization and procedure were shortly completed, and your present incumbent was appointed chairman of the division.

The accounting division is composed of standing committees of accounting officers who, with the assistance of the staff of the department, give consideration to, and act upon, subjects to promote the more efficient conduct of the accounting departments of carriers to insure uniformity and standardization of inter-road statements, accounts and settlements, and other routine matters of accounting problems, under substantially the same procedure as previously existed in the Railway Accounting Officers Association.

Accounting and statistical research activities may also, in the judgment of the vice-president of the department, be assigned to special committees within the division, for the purpose of considering changes in requirements of regulatory bodies or for the

purpose of assisting other departments of the association, or receiving assistance from them.

Period of Transition Over

During the period of transition little of importance in railway accounting was accomplished; however, it is a pleasure now to announce that accounting affairs within the division are handled practically along the same lines as they were under the Railway Accounting Officers Association, and are moving along with dispatch, resulting in accomplishments as fully set forth in the printed Agenda for the years 1935 and 1936.

The 1935 Agenda, containing reports of the activities of the standing accounting committees for the period from the White Sulphur Springs meeting (1934) to June 30, 1935, was distributed with the view of expediting, through letter ballot, the action required on the recommendations and reports of those committees. The results of the letter ballot were distributed to accounting officers during December, 1935. The mandatory rules and forms were published in separate pamphlet form.

Not Exclusively an A.A.R. Group

The rules of order of the accounting division provide that all accounting officers of member roads of the Association of American Railroads shall be entitled to active membership in the division. Bona-fide common carriers, not full members of the association, may hold active membership in the division, with limited voting powers. Accounting officers of lines not now full members of the association have, in the past, contributed substantially to the success of the accounting officers' organization, and through the foregoing provision in our rules of order, have perpetuated their keen interest in railway accounting affairs by a continuation of their memberships. The short lines have generally recognized the benefits to be derived from membership in the accounting division as well as the additional advantages accruing from our increased activities in dealing with current problems affecting the railway industry. In applying for such membership, these carriers have agreed to apply and make fully effective the mandatory accounting rules of the division, and have agreed to be bound by such rules as are now effective or as may hereafter be promulgated by or through the accounting division.

It is gratifying to note that the membership of the accounting division now comprises 266 member roads and subsidiaries, represented by 565 accounting officers. In addition, 186 carriers and subsidiaries, formerly members of the R.A.O.A., are enrolled with a representation of 189 accounting officers. Thus, the total membership of the division at this time consists of 452 carriers, represented by 754 accounting officers. The division is now carrying the names of 57 persons on its honorary rolls.

In addition to the results shown in the Agenda, there have been many accomplishments by the accounting department not referred to therein. These are in the nature of measures modified or withdrawn which have resulted in an indirect saving of large amounts to the carriers by reason of curtailing what would otherwise have proven additional heavy burdens. This was accomplished by our vice-president and members of the accounting division through frequent contacts with the representatives of the Bureau of Accounts, Bureau of Statistics, Bureau of Motor Carriers of the Interstate Commerce Commission, the Securities and Exchange Commission, the Federal Co-ordinator of Transportation, and others.

Inhibiting Expensive Changes at the Source

More important subjects under this head given attention during the past year were:

1. Report made to the Interstate Commerce Commission by Professors William J. Cunningham of Harvard and Kent T. Healy of Yale, containing recommendations for changes in statistical reports made by the carriers to the Commission. An agreement was reached in which relatively minor changes were required in operating statistical reports and practically no increase in expense has been involved.

2. Bureau of Statistics, Interstate Commerce Commission, proposed a change in the rules governing separation of operating expenses between freight and passenger service which would have required separating operating expenses between line and terminal operations at all stations. Minor changes were agreed upon and adopted, with little or no increase in expense to the carriers.

3. The accounting division, in conjunction with the purchases and stores division, was instrumental in withholding a proposed Federal Co-ordinator questionnaire requiring the classification of material and supplies and repricing second-hand materials.

4. Proposed drastic revision of the Interstate Commerce Commission classifications of accounts requiring depreciation charges upon fixed property, which had been under consideration for many years, and was so ably handled by the special committee headed by J. J. Ekin as chairman, was finally brought to a conclusion during the past year by the issuance of orders by the Commission cancelling 37 accounts, revising 33 accounts, and adding 8 accounts, together with necessary changes in the instructions and interpretations of accounting bulletins, all of which may be considered of minor importance as compared to the changes proposed during the period the subject was under consideration. Under date of March 28, 1936, the Commission, by formal order, discontinued the proceedings begun through notice dated October 11, 1927, in Ex Parte 91, covering the general revision of accounting rules for steam railroads.

Growing out of the revision of the classifications and by provision of the Emergency Transportation Act of 1933, it was made the duty of the Co-ordinator to investigate and consider "Cost Finding in Rail Transportation." There was recently distributed by the Co-ordinator his report on "Cost Finding in Railway Freight Service for Regulatory Purposes." This report is the result of the study made by John H. Williams with the assistance of representatives of the Interstate Commerce Commission and an advisory committee consisting of three railroad officers, two non-railroad members, and a representative of the state commissions.

"Cost Finding"—That Hardy Perennial—Bobs Up Again

It is the estimate of the author that the approximate expense to the carriers for the first year will be $2,000,000 to put the proposed plan in effect, and it is believed that cost after the first year should diminish so that the out-of-pocket expense within a few years would be something less than $500,000 per annum.

One of the author's tentative plans was before the accounting advisory committee for criticism during the year, and that committee went on record "that cost finding for rate making by individual commodities is impracticable." The plan provides for a continual and regular reporting by the carriers to the Interstate Commerce Commission by means of a supplement to the annual report. It is hoped that the Commission will not burden the carriers with this additional expense.

In reviewing the reports of former presidents of the Railway Accounting Officers Association, it is disclosed that the remarks of many of them concerning the year of their stewardship indicated that "never before had accounting questions so fraught with trouble and of such a complex nature existed." Those remarks might also be applied to the conditions of the present time, but we should consider these new and complex problems simply routine matters which may be expected currently for the future if the railroads expect to keep abreast of, and progress with, the times. When we reach the point where these complex and troublesome affairs disappear, we will be slipping backwards instead of progressing.

During the past several years we have had a new word connected with the railroad industry—Co-ordination. That word as related to the railroad industry is practically synonymous with "Co-operation." The only difference is that in the case of co-operation all parties at interest proceed voluntarily—while in the case of co-ordination, one or more parties at interest may be partially or wholly reluctant.

The history of railroad accounting reveals the fact that railroad accountants have been pioneers in the field of co-operation—both departmentally within our own organizations and as between carriers.

One of the most important accomplishments in this direction was the plan evolved by railroad accountants for speeding up the movement of traffic through the inauguration of through billing, with prompt and accurate audit office settlement of the revenue between carriers.

Observing Rules Only Preventive of Great Confusion

This could not have been accomplished without co-operation, and is based entirely upon good faith that the settling or destination carrier will fairly apply the divisions and settle fairly with all lines interested in the movement of the traffic. If the destination carrier does not faithfully fulfill the trust imposed upon it under these mandatory rules, and other interested carriers do not receive their fair and just return for the service performed, there is only one recourse left for them, and that is to revert to the old form of junction settlement as a matter of self protection.

We are all familiar with the additional cost to the carriers in making junction settlements, as well as the adjustment of discrepancies arising therefrom, together with the delay in the movement of the traffic and the inconvenience to shipper and consignee. Such a condition is certainly not co-operation, and surely none of us wish to revert to those conditions. Therefore, we should abide by the rules, although temporarily there may be disputes or other reasons where one or more of the interested

carriers feel that they are not receiving their just revenues for the services performed.

I wish to impress upon all of you, no matter how serious a controversy may appear, that our rules be strictly adhered to and any controversy disposed of in an orderly manner, rather than to follow a procedure which will result only in confusion to all concerned.

Fletcher Counsels Courage

Judge Fletcher prefaced his discourse on railway policies and outlook by reading the recent decree of the district court of the District of Columbia in the pension case, giving his interpretation of its immediate effects and advising the steps which the accounting officers should take in view of this decision. He offered to answer questions from the floor and many were put to him.

Following this colloquy, he expressed a considerable degree of optimism as to the outlook for the railways. Among railway men everywhere he detected a new hope, a new tone, a revivified spirit. Railroad men generally are holding their heads higher, their shoulders squarer. Railroad ingenuity has found ways of attracting new business; traffic is coming back; the last session of Congress adjourned without the passage of any legislation directly inimical to the railroads.

True, the tax bill raises up difficulties and the Pettengill bill did not pass. The railroads have no reason for exaltation—but the absence of the latter is no handicap. Rather it is an advantage; over-confidence is as dangerous as disheartenment.

The Resourceful Man Thrives on Difficulties

The effect of the depression has not been all bad. By surviving it a new discipline has been acquired, and the railroads have learned a great deal. One of the most valuable things they have learned is how cheaply they can operate. Expenditures, formerly considered unavoidable, have been eliminated and, with the revival in business, many of them are not returning. Some of the roads have been repaying their loans from the Reconstruction Finance Corporation—a hopeful sign, because persons unfriendly to the railroads have constantly misinterpreted these loans as charity, rather than in their true light as a profitable commercial transaction for the government, made only on the deposit of liberal collateral.

The railways, the speaker said, have lived through one crisis after another since their inception—the pioneering days, the period of the formation of great systems, the period of the granger laws, federal control, and post-war "prosperity." The railways have struggled through each of these to ever greater achievements of economy and public service. The crisis from which we appear to be emerging should have similar wholesome effects, in his view.

"Ease in Zion" a Danger

The appearance of competition in transportation, Judge Fletcher viewed as far from an unalloyed evil. True, the nature of the competition with which the railways are faced is in many respects wholly unfair and unequal and inequalities should be removed, but competition *per se* is not bad. Few persons can raise themselves to such heights of moral power that they can withstand the temptation to sloth which monopoly affords. "Woe to them that are at ease in Zion."

Few occurrences could come about which would do more to bring general recovery than a genuine railway revival. However, in the speaker's view, it would be unsafe to go to the public offering such "secondary benefits" alone. Rather the railway appeal for public approval must be based primarily on real accomplishments: Modern service at lower costs.

The Government Ownership Bugaboo

Government ownership, Judge Fletcher pointed out, would be no solution to any of the difficulties of the present transportation situation. Certainly it could not provide lower rates, if our war time experience is any criterion, unless the rates were made artificially low by diluting them with taxes.

Private ownership and operation of transport is a striking characteristic of democratic countries, such as Great Britain, France and the United States. And government ownership and operation has reached its nadir in such totalitarian states as Italy, Germany and Russia. There is nothing in government ownership to offer any economic inducements to our people, and nothing in our political heritage to incline our people toward it as a theoretical ideal. If our political philosophy should turn socialistic, then, of course, the railways are vulnerable; but until it shows definitely that trend, there are other more live and important problems than the danger of government ownership which should engage us.

"Railroad Credit" a Meaningless Term

Railroad credit, in the speaker's view is not in the parlous state popularly ascribed to it. Actually there is no such thing as "railroad credit" seen as a whole, any more than there is "retail merchants' credit" or "automobile manufacturers' credit." What actually does exist is the credit of individual railroads and, as is the case with every industry, the credit of some companies is good and that of others is not so favorable. To be sure, many railroads are in the hands of the courts, but many banks and other concerns as well have had difficulties, without the generalization being drawn therefrom that the credit of the whole business was bad. Actually, the highest quotation of any stock on the New York Stock Exchange is that of a railroad, and many railroads are refunding obligations at rates which compare favorably to those which any industry can command.

Actually the greatest problem facing the railroads is that of adapting its methods to the demands of modern business. And with that goes the corollary of an easing of the refinements of regulation which will make such adaptation possible. The British railways are permitted to contract with a shipper to handle all his business at a flat rate per ton based on past business. In America, by contrast, the sacred complexities of rate relationships are considered more important than rates which will give the customers what they want and get the business moving.

Extravagances of Regulatory Formalism

Our public regulation has become involved in a maze of administrative formalism. Experienced business men could sit down with railroads and shippers, settling all their differences to their mutual satisfaction and in the public interest far better than months of formal procedure before adorers of precedents and hair-splitting legalistic minutiae. And yet the railroads so far have failed to get relief even from such an absurd anachronism (in an era of transport competition) as the Fourth Section, with the library of involved legalism which has grown up around it and which must be conned in every Fourth Section proceeding.

But the trend, in Judge Fletcher's view, is away from the absurd lengths to which regulation has gone; and toward simpler measures. Management will have greater

latitude in which to function, as the pendulum swings away from the aggrandizement of bureaucracy; and in that greater latitude lies the hope that the railways may bring their service fully up to the necessities of modern business and modern competition.

In the failure of Congress to continue the post of Co-ordinator the trend away from bureaucracy is, in Judge Fletcher's view, clearly discernible. Mr. Eastman is an intelligent, industrious, honest civil servant. The studies made by his staff contain much information of merit, and such portions the railways will have no hesitancy in using. But improvement, "co-ordination," is a process which must be worked out in time. The steps to be taken are too complex and too interdependent to be taken all at once without serious consequences. And the railroad industry cannot be successfully reformed by imposition from without. Given a reasonable degree of opportunity, salvation will issue—as it should—from within the industry itself.

That opportunity, it now appears, will be given in some measure at least. Traffic is reviving and, favorable as that trend is, it is only one of the reasons why railroad men may look forward to the future with a hope and a confidence which has greater justification today than at any time in years.

Bunting on Division Controversies

The difficulties and complexities of interline divisions were discussed in several papers—one phase by G. J. Bunting, vice-president, Illinois Central, whose contribution follows in part:

Statements of differences for many years have been a nightmare to freight auditors and traffic officers responsible for their handling. Few traffic officers have tackled it with hopes of obtaining amicable settlements in full; indeed where such settlements have been obtained, there has seldom been proper provision applied to take care of the future. Invariably it has been the practice to settle the past, let the future accumulate, and make another settlement. Thus we have run around in vicious circles over and over again.

In discussing this subject from the particular viewpoint of the companies which I represent, I arrange my comment in three general divisions, as follows:

1. Causes of disputes, with resultant statements of differences.
2. The procedure employed in recent years in attempting to dispose of controversies.
3. The results thus far obtained.

1. *Causes of Disputes.*—At the end of 1932 we had on hand 185,564 statements of differences of all classes involving an amount of $4,216,104, while as of June 1, 1936, we had on hand 105,740 representing the sum of $2,493,191; thus we have made a reduction of 79,824 in number and $1,722,913 in amount. These statements of differences comprise the residue following completion of our accounting department's investigation of several hundred millions of dollars of revenue. Adjustment of these differences was found impossible through correspondence, personal contact or any other normal accounting manner; the items thus involved could be finally disposed of only by (1) adjustments as rendered by the other lines, (2) amendments to their bases or (3) cancellation and withdrawal—each step of which could only be accomplished through traffic department handling and authority.

a Disputed divisions.—Interline accounting abstracts rendered by reporting carriers distributing the amounts due each carrier in settlement of freight charges for shipments moving over more than one railroad are usually made from authorized division sheets published by the reporting carrier in conjunction with those carriers participating in the movement. However, in many instances these divisions are not agreed to; hence there is a dispute, and the division is made on bases originating through instructions or division sheets furnished the accounting department by the traffic department of the reporting line. These instructions or division sheets, in case of a dispute, give less revenue to the originating carrier or to the intermediate carrier or to both, as parties to the tariff, than they claim is due them. Therefore the divisions used do not conform to the settlement basis authorized by the traffic departments of other carriers parties thereto, and such settlements are not accepted.

b Cases where divisions have not been published by any of the carriers concerned.—Settlements by reporting carriers in these instances are effectuated usually by the application of various divergent unauthorized methods or bases, some of which are considered reasonable, others unreasonable. It is our practice to issue statements of differences against all reporting carriers' unauthorized settlements which in our opinion appear unreasonable. So far as we are concerned (and I believe it is true with most of the railroads) the action of the accounting department is governed exclusively by our traffic department's authorized divisional bases or instructions.

c Solicitation of traffic over routes via which lowest through rates are applicable, but for which agreed divisions have not been arranged or published.—To a certain extent this cause is a throwback to the federal control period, but not entirely. During the recent depression the solicitation of traffic by all carriers has been very intensive and by routes with respect to which no thought has been given as to whether settlement bases have been agreed upon. In many instances such movements of freight are non-recurring. In others they are continuous, with the resultant issuance of statements of differences on each shipment or group of shipments, which automatically and invariably requires the traffic department to handle for final disposition. It has been our experience that this is now one of the major causes of unadjusted, disputed or no-division controversies; it had become alarming in proportion.

I wish that the Association of American Railroads or some other authoritative body could have a rigid rule, that must be observed by all carriers, to the effect that under no circumstances will consideration be given to new joint rates which are not accompanied by authorized division sheets. I am sure that if this were done our difficulties with respect to differences would be promptly solved. If there is any one thing in which the freight auditor can be helped by the Association of American Railroads or the Interstate Commerce Commission, this is it.

2. *The Procedure employed to dispose of controversies.*—Several years ago we installed a "recheck bureau" in our offices under the direct supervision of the comptroller, to revise our interline settlements, thus catching all discrepancies in amounts reported to us by other carriers or by us to other carriers, as the case might be. While this may have appeared expensive, it not only has proved profitable but has served to put on notice all our employees handling interline accounts that if they make errors or pass unauthorized divisions such failures will be detected. The moral influence has been worth the cost regardless of the profitability of the bureau in other ways. Then, too, we recheck the "recheck bureau," thus maintaining the morale in that organization.

At a cost of approximately $650,000 we have established approximately $10,000,000 of debit and credit differences for which settlements have been effectuated.

Action and final authority incident to the disposition of all of our statements of differences is vested in our traffic department; and therefore, the treatment accorded thereto could probably better be described by representatives of that department. However, our accounting department is vitally and intensely interested in the traffic department's handling and negotiations with the roads against which such statements of differences have been issued. To remove these disputes brings about a more harmonious condition and a more favorable reaction among the roads involved and, last but not least, removes a major cause for routing shipments away from our line.

At the end of the month the accounting department furnishes to the traffic department a statement showing by foreign roads the number of such disputed division statements of differences on hand and the aggregate amount of additional revenue we believe due the Illinois Central System. This statement by comparison with the previous month's report enables the traffic department to determine exactly what has been accomplished during the current month and what progress has been made in the settlement with each individual road during the previous month. In the last twelve months this progress has been most gratifying.

We have an arrangement for joint traffic department conferences with other roads' traffic representatives, so that through personal contact agreements can be reached for the disposition of disputed divisions *on both sides of the account,* and at the same time there can be agreement on the issuance of division sheets.

3. *Results thus far obtained.*—There has been more accomplished in removing these disputes since January 1, 1936, than has obtained for any ten years prior thereto. On January 1, 1936, we had 17,581 statements of differences with twelve roads involving disputed divisions, of which 13,115 have since been disposed of through joint conference up to May 23, 1936. The percentage of disposals to the number originally on hand is 74.6, while as to some of the roads it is as high as 100. In addition to this, we disposed of differences existing in the accounts of other lines parties to the conferences.

In addition to the results already accomplished, we have joint

traffic department conferences in session at the present time with large Class I carriers, and arrangements are being made for future conferences with ten other large Class I carriers. There are three reasons why we desire to have this done: We want to get rid of existing disputes; second, we want to avoid future disputes; third, we want to be on the friendliest basis possible with our connections.

Eastman Urges Clearing House, Cost Finding

In a characteristically forthright communication to the convention, Commissioner Eastman once more plumped for a railway clearing house and for the adoption of routine cost accounting. His letter read in part as follows:

In the past three years I have indulged in so many comments and suggestions of one kind and another that my supply is running low. However, there are one or two that I have already made which I can perhaps use over again. They are still available, because they have not as yet been followed.

The depression has taught certain things about accounts. I presume, and in fact I know, that it has taught you that there were various things which could be done just as well more cheaply than they had been done. It has also taught the Commission that its classification of accounts were not immune from various forms of manipulation to make things appear better than they really were, and that the relations between parent and subsidiary or affiliated companies offer particular temptation in this respect.

Lack of Uniformity in Stores Accounts

In my work as Co-ordinator, I dealt with certain matters which have a relation to accounting. In the consideration of the handling of materials and supplies we found that methods of reporting material stocks and material store expenses were far from uniform. Not only does this prevent accurate and informing comparisons between the results achieved by the purchasing and stores departments of the various railroads, but it also affords some opportunities for manipulations, particularly in the accounting for secondhand materials. The Commission is giving this matter attention, but it is a matter on which the accounting division ought to be able to arrive at definite conclusions and recommendations. It is one illustration of several important situations where the railroads by the establishment and maintenance of uniform records could facilitate comparisons between their operations which could be followed up to great advantage.

Another subject in which I take a very great interest, which some of you may think amounts to an obsession, is the establishment of a central railroad organization in the nature of a clearing house for the better and more economical handling of various intercompany transactions. The idea is, of course, not new and it has been successfully applied for many years in Great Britain. Adverse reports by committees of accounting officers have been made on this proposal. I have read those reports with entire willingness to be convinced that the proposal was unsound, but I have not found them convincing. On the contrary, I believe that if you will pursue this subject faithfully and diligently, you will yourselves become convinced that inherently the idea is sound. It is quite possible that the particular plans which we offered for its practical application are not the best that can be formulated, but I doubt whether any of you would care to defend the proposition that present methods of accounting and settling for the numerous and important railroad intercompany transactions are not capable of a vast amount of improvement.

Finally, let me say a word about another subject which I suspect may not be altogether popular with you. One of the last acts of the Co-ordinator was the issuance of a report on "Cost Finding in Railway Freight Service for Regulatory Purposes," a report on which, I hasten to say, we received most important assistance from both the Bureau of Statistics and the Bureau of Accounts of the Commission. I realize that the subject of this report is one which inspires much apprehension in the railroad heart. This apprehension is not, I think, justified. There is more reason for hope than for fear. However that may be, the subject is one which you will agree has for some time been moving toward the front, and whether you like it or not, I venture to guess that you will not escape a thorough discussion of the subject directed toward specific action. I suggest, therefore, that you give it the most careful attention and, if you do, I am not without hope that you may find in it more virtue than vice.

Mr. Eastman's letter was referred to the general committee for report and action.

Other Papers and Reports

J. J. Ekin, vice-president and comptroller of the Baltimore & Ohio, gave a resumé of the development of the accounting classifications, with particular reference to the period since 1922. He reviewed the efforts made by the accounting officers to bring about simplification of accounts, and the extensive investigation by the Interstate Commerce Commission into proposed routine cost accounting and accounting for depreciation. (The Commission formally discontinued the proceedings in Ex Parte 91, revision of accounting classifications, on March 28, 1936, the same having been instituted in 1927.)

Mr. Ekin referred to the latest attempt of the "cost finding" protagonists to impose this procedure on the railroads, to wit, the Federal Co-ordinator's recent report on the subject. Mr. Ekin said he had not changed his position; that he still opposes any expensive routine cost accounting process, whether for the regulation of rates or any other purpose.

He expressed the highest confidence in the Bureau of Accounts of the Interstate Commerce Commission. Emphasizing the necessity for railroads' giving a complete transportation service, and not rail transport alone, from the producer to the consumer, Mr. Ekin stressed the desirability of simplified accounting to foster this development. Complex bookkeeping, in his view, would prove an obstacle to this improved service. Divisions of interline rates, he asserted, must be clear and simple so that interline accounts can be settled currently.

Following this presentation by Mr. Ekin, W. C. Wishart, vice-president of the New York Central, called attention to the vast volume of work Mr. Ekin had done in connection with proposed revision of the accounting classifications, all the while keeping up with his own work on his own railroad. Mr. Ekin's activity in Mr. Wishart's view, was a sufficient answer to "those who contend that committee chairmen should not succeed themselves."

Thomas Elucidates the Revenue Act

E. M. Thomas, comptroller of the Chesapeake & Ohio, read a paper on accounting with reference to income taxes. He surveyed briefly the history of income taxation in this country and dwelt specifically on some of the problems which have arisen recently, due to changes in administrative attitude.

Prior to 1934, Mr. Thomas explained, the policy of the railroads with respect to depreciation did not have important bearing on their income taxes; any failure of depreciation charges to meet the cost of retirements could be covered by charging retirements to income in the year they were made. But in 1934 all this was changed when Secretary Morgenthau of the Treasury changed the rules to put the burden of proof on the corporate income-taxpayer as to any charges to be made on account of retirements. Where nominal rates of depreciation only are in effect, he explained, the Treasury will allow a charge for retirements; but where the rate has been set to approximate an "average" life for the equipment, then retirement losses necessitated by an actual life less than the "average" cannot be charged to income.

For the railroad to be able to enjoy the advantage to which it is entitled of charging to operating expense the cost of all equipment worn out in service, it is

forced to keep two sets of books—one charging only nominal depreciation (so the Treasury will permit it to charge retirements); and another showing depreciation at rates reflecting the average life of the equipment.

On roadway property, it is difficult if not impossible to charge for depreciation or retirement unless the railroad has been charging depreciation on such property for a long time. And the cost of establishing in the courts the right to make such charges might well exceed the savings in taxes.

Discussing Mr. Thomas' paper, F. J. Fell, Jr., vice-president and comptroller of the Pennsylvania, expressed the belief that railroads should keep current figures of taxable net income. Mr. Wishart urged that government bureaus in Washington ought to agree that the Interstate Commerce Commission was the final authority on the correctness of railway accounts and that the internal revenue department should accept its opinions. He suggested that the Commission's staff might properly approach the internal revenue functionaries to urge this point of view upon them.

Every Railroader Has a Public Relations Duty

Col. Robert S. Henry, assistant to president of the Association of American Railroads in charge of public relations, addressed the convention on public relations matters. Public relations, Col. Henry pointed out, consisted of the sum total of all the contacts between all railway staff and the entire body of the public. It is not, as some may think, a job for specialists, but rather is one for every person on the railroad payroll—for all of them have contacts with the public and by the sum-total of these contacts the railroad industry is judged.

The railroads do not, he indicated, lack publicity. Indeed the machinery which exists for overemphasizing and sensationalizing and distorting everything unfavorable which may exist in railroad operation is a marvel of efficient performance. It is not so much publicity in the press that the railroads need, therefore, as word of mouth interpretation of their achievements by individuals in railroad service to other individuals in every walk of life.

The tremendous opportunity that railway personnel has of building up a favorable point of view toward the industry he said was shown by the fact that on one small railroad alone 13,000,000 telephone calls were received from the public in a year. Was the response of railroad personnel to those 13,000,000 calls such as to impress the inquirers with railroad courtesy and the high quality of railroad service and efficiency?

And the railways do have a story to tell—a fascinating one: 50 per cent increase in train speeds in a decade; a 40 per cent decrease in operating costs per net ton-mile; an end to car shortages; pioneer work in passenger comfort; higher speed in passenger service; unrivalled dependability; and a safety record which sets a standard by which all other efforts at greater safety are gaged.

He mentioned the recurrent criticisms of railroads which are not based on the facts, for example, failure to "co-operate." Actually, he pointed out, the railways are the outstanding example in all industrial history of this very characteristic which they are popularly charged with not possessing. The interchange of traffic between companies, a multiplicity of joint activities exist on the railroads and nowhere else to such degree. There are some 25,000 miles of joint track in the country and thousands of "co-ordinated" terminals; and there would probably have been more, he added, had there not been enacted a law which tried to force the railroads to do what they were already doing in this direction.

As for research, Col. Henry asked that performance be measured by results. Research to be effective does not have to be done in a polished laboratory, and, judged by results in reducing costs and improving service, the kind of research the railroads do has shown itself to be at least as effective as that done by any other industry.

The railways' principle trouble, he said, was a lack of gross revenue and this arose in large measure from another railway handicap, namely, the diametrically contradictory policies of the government in dealing with the railways on the one hand and all other forms of transport on the other. The user of railway service is expected to pay not only the operating cost of moving the vehicle, but also must pay costs and taxes for the way on which the vehicle moves. By contrast, with other forms of transport, the user is expected to pay only the cost of moving the vehicle, and sometimes not even that.

Some of our water transport is so expensive that only a lavish and limitlessly wealthy government could possibly keep it going. A ship canal is being dug from Chesapeake Bay to the Delaware which will save vessels 11 hours of navigation. Yet while yielding such a benefit, the government does not once think of asking the beneficiaries to pay something for what they receive.

An important task before the railroads in their public relations work is to bring about greater consistency in public policy in dealing with transportation, to the end that the users will pay for what they get and each transport task will be performed by the agency which is best able, all costs considered, to handle it.

When a man mails a letter to go by rail, he uses a 3-cent stamp and of that 3 cents the railroad gets approximately ½ cent and the government gets the remainder. By contrast, when he mails a letter air mail, he uses a 6-cent stamp, and the air carrier gets all of that 6 cents and another 6 cents from the government besides.

Joint Pullman Accounting

The reports of the various committees varied little from the printed Agenda issued in advance—that of the committee on freight accounts being the most extensive, and covering 54 subjects. The passenger accounts committee made a few minor changes in presenting its report.

Mr. Wishart raised a question as to the advisability of the A.A.R. setting up a joint accounting bureau in the offices of the Pullman Company to handle accounting matter with that company on behalf of all the railroads and a formal communication will be sent to member roads seeking their view on this proposal.

In addition to the addresses and papers already mentioned there were several others, among them the following: "Standardizing Passenger Accounting Methods" by L. B. Pond, auditor of revenue, New York, New Haven & Hartford; "Simplified Interline Freight Accounting Procedure for Waybills Covering L.c.l. Freight," by A. T. Martin, auditor, Southern; "Application of Divisions on Interline Traffic by the Freight Accounting Officer," by Edward Ross, auditor of freight and passenger revenues, Delaware, Lackawanna & Western; "Overcharge Accounting Procedure" by Noah Garner, auditor freight accounts, Southern; "District Accounting—Manual Methods," by A. E. Lawler, auditor of disbursements, Illinois Central; "Centralized Accounting—Mechanized Plan" by F. J. Moran, auditor of disbursements, Reading; "Tariff Simplification" by J. G. Kerr, assistant to vice-president, A.A.R.; "Negotiating Divisions" by R. N. Nash, assistant to vice-president, A.A.R.

The addresses of Messrs. Swaine ("Railroad Reorganizations") and Kerr ("Tariff Simplification") will be published in abstract in early issues of the *Railway Age*.

Engineers and Scientists Discuss Materials at Atlantic City

Near record attendance and adoption of many standards mark thirty-ninth annual meeting of American Society for Testing Materials

ONE of the most largely attended and active annual meetings in the history of the American Society for Testing Materials was held at Atlantic City, N. J., June 29 to July 3, as 1,131 members and guests assembled to report on and adopt standards and specifications for materials and methods of testing, of interest alike to both producers and consumers. In only one other year, 1931, at the annual meeting held in Chicago, was the attendance larger than at the 1936 Atlantic City meeting.

In accordance with the practice of the society, the program of the meeting consisted of special committee and sub-committee meetings and general sessions, there being a total of 18 general sessions for the formal presentation of reports and papers, and approximately 200 meetings for individual committee work. Altogether, approximately 120 reports and papers were presented, covering a wide range of materials and of methods of analyzing and testing such materials. The only note in the entire program deviating from the strictly physical sciences was struck by the president, Harvey S. Vassar, laboratory engineer, Public Service Electric and Gas Company (N. J.), in his address, which was given over almost entirely to a discussion of the social or non-material problems of the day. In his address, Mr. Vassar called for increased interest and activity among the physical scientists of the country in solving these problems.

"In the treatment of the physical problems in their respective fields," he said, "a reasonably successful technique has been developed. If you like, you may call this scientific approach, or, perhaps, common sense would be just as good a name. Unless we are willing to admit the truth of the charge that we have degenerated into a nation of cynical materialists, devoid of those characteristics of our forefathers of which we boast, is there any valid reason for abandoning our methods of approach when stepping, as we must, from our vocation into the non-material field?"

During the meeting, 31 new tentative specifications were accepted for publication as tentative and 76 existing tentative specifications and tests were approved for reference to society letter ballot for formal adoption as standard. In addition, many revisions were approved in existing standards and tentative standards. This represents unusual activity with regard to formal action on the standards of the society, which is accounted for largely by the fact that this is a "Book of Standards" year, the book being revised and republished every third year.

A. C. Fieldner, chief engineer, Experiment Station division, U. S. Bureau of Mines, Washington, D. C., was elected president for the ensuing year. The new members of the executive committee include O. U. Cook, assistant manager, Department of Metallurgy, Inspection and Research, Tennessee Coal, Iron and Railroad Company; H. F. Gonnerman, manager, research laboratory, Portland Cement Association; C. S. Reeve, manager, research development, The Barrett Company; F. E. Richart, research professor of engineering materials, University of Illinois; and F. M. Waring, engineer of tests, Pennsylvania Railroad.

The Waldorf-Astoria Hotel, New York City, was selected for the meeting next year, which will be held June 28 to July 2.

Steel and Steel Products

Throughout the meeting, consideration was given to a large number of subjects of direct or indirect interest to railway engineering and mechanical officers. In the following, brief reference alone will be made to the action of the society on the more important of these subjects.

Ferrous metals, including steel, wrought and cast iron, and a wide variety of products formed or fabricated from such metals, were given consideration in a large number of reports and papers. The recommendations of the Committee on Steel, presented by H. H. Morgan, chairman (manager, rail and fastenings department, Robert W. Hunt Co.) affected 52 standards and tentative standards, including the adoption of 14 tentative specifications as standards. A partial list of the standards affected, all of which were acted upon affirmatively, follows:

Proposed Tentative Specifications

High-carbon-steel joint bars;
Quenched carbon-steel joint bars;
Structural nickel steel;
Fabricated bar or rod mats for concrete reinforcement;
Welded wire fabric for concrete reinforcement; and
One-wear and two-wear wrought steel wheels.

Proposed Revision of Standards

Specifications of wrought solid carbon-steel wheels for steam railway service (A 57-29).

Proposed Revision of Tentative Standards

Specifications for heat-treated carbon-steel and alloy-steel track bolts (A 183-35T); and
Specifications for carbon-steel castings for miscellaneous industrial use (A 180-35T).

Adoption of Tentative Standards as Standards

Axle-steel concrete reinforcement bars (A 160-35T);
Alloy-steel castings for structural purposes (A 148-33T);
Carbon-steel and alloy-steel castings for railroads (A 87-35T);
Black and hot-dipped zinc-coated (galvanized) welded and seamless steel pipe for ordinary use (A 120-34T);
Electric-fusion-welded steel pipe (Sizes 30 in. and over) (A 134-32T);
Electric-fusion-welded steel pipe (Sizes 8 in. to, but not including 30 in.) (A 139-34T);
Carbon-steel plates for boilers and other pressure vessels for stationary service (A 70-35T), as revised;
High tensile strength carbon-steel plates for pressure vessels (Plates 2 in. and under in thickness) (A 149-35T);
High-tensile strength carbon-steel plates for fushion-welded pres-

sure vessels (Plates over 2 in., up to and including 4 in. in thickness) (A 150-35T), as revised;
Lap-welded and seamless steel pipe for high-temperature service (A 106-34T);
Electric-fusion-welded steel pipe for high-temperature and high-pressure service (A 155-34T);
Alloy-steel castings for valves, flanges and fittings for service at temperatures from 750 to 1,100 deg. F. (A 157-35T);
Seamless alloy-steel pipe for service at temperatures from 750 to 1,100 deg. F. (A 158-35T); and
Forged or rolled alloy-steel pipe flanges, forged fittings, and valves and parts for service at temperatures from 750 to 1,100 deg. F. (A 182-35T).

Adoption of Tentative Revisions of Standards Specifications

Open-hearth carbon-steel parts (A 1-30);
Steel for bridges (A 7-34), as amended;
Steel for buildings (A 9-34), as amended;
Structural silicon steel (A 94-33), as amended;
Structural rivet steel (A 141-33);
Carbon-steel bars for railway springs with special silicon requirements (A 68-27);
Carbon-steel car and tender axles (A 21-27), as amended;
Quenched-and-tempered carbon-steel axles, shafts and other forgings for locomotives and cars (A 19-27), as amended;
Quenched-and-tempered alloy-steel axles, shafts and other forgings for locomotives and cars (A 63-27), as amended;
Welded and seamless steel pipe (A 53-33);
Lap-welded and seamless steel and lap-welded iron boiler tubes (A 83-34);
Boiler rivet steel and rivets (A 31-24);
Carbon-steel castings for valves, flanges and fittings for high-temperature service (A 95-33); and
Forged or rolled steel pipe flanges for high-temperature service (A 105-33).

Withdrawal of Standard Specifications

High-carbon-steel splice bars (A 5-14);
Quenched high-carbon-steel splice bars (A 49-21);
Quenched carbon-steel track bolts (A 50-33);
Quenched alloy-steel track bolts (A 51-33);
Structural nickel steel (A 8-29);
Carbon-steel castings (A 27-24);
Carbon-tool steel (A 71-26);
Alloy-tool steel (A 115-28); and
High-speed tool steel (A 92-26).

The two proposed tentative specifications covering joint bars, it was pointed out, are essentially extensive revisions of the existing Standard Specifications for High-Carbon-Steel Splice Bars (A 5-14) and for Quenched High-Carbon-Steel Splice Bars (A 49-21), and were developed jointly by the committee and the track committee of the American Railway Engineering Association. Concurrent with the adoption of the proposed tentative specifications, the committee, as noted above, recommended the withdrawal of the existing standards, (A 5-14) and (A 49-21), which recommendation was approved.

The withdrawal of the Standard Specifications for Quenched Carbon-Steel and Alloy-Steel Track Bolts, (A 50-33) and (A 51-33), was recommended since these specifications are now superseded by the Tentative Specifications for Heat-Treated Carbon and Alloy-Steel Track Bolts (A 183-35T), developed jointly with the American Railway Engineering Association, and adopted in 1935.

The new Tentative Specifications for Structural Nickel Steel, superseding the Standard Specifications for Nickel Steel (A 8-29), provide for a nickel steel of higher strength than under the existing standard. The committee reported that it expects to present in the near future a specification for high-strength structural rivet steel which can be used with the structural nickel steel provided under the revised specifications.

The new Tentative Specifications for One-Wear and Two-Wear Wrought Steel Wheels cover wheels with 1¼-in. rim thickness which conform to the requirements of the Association of American Railroads, and also cover wheels with 2-in. rim thickness. The revisions recommended in the Standard Specifications for Wrought Solid Carbon-Steel Wheels for Steam Railway Service (A 57-29), were proposed in order to bring the carbon content and tolerance for wheels for tender and passenger car service into line with corresponding requirements of the Association of American Railways.

Other Ferrous and Non-Ferrous Metals

Among the many recommendations of the Committee on Wrought Iron affecting standards were the following, all of which were approved for submission to the society by letter ballot for adoption.

Revision of Standards

Specifications for refined wrought-iron bars (A 41-30);
Specifications for staybolt, engine-bolt and other high-grade wrought-iron bars (A 84-33); and
Specifications for hollow rolled staybolt iron (A 86-35).

Adoption of Tentative Standards as Standards

Specification for uncoated wrought-iron sheets (A 162-35T); and
Specifications for zinc-coated (galvanized) wrought iron sheets (A 163-35T).

Adoption of Tentative Revisions of Standards as Standards

Specifications for wrought-iron rolled or forged blooms and forgings for locomotives and cars (A 73-30);
Specifications for lap-welded and seamless steel and lap-welded iron boiler tubes (A 83-34);
Specifications for staybolt, engine-bolt and other high-grade wrought-iron bars (A 84-33); and
Specifications for hollow rolled staybolt iron (A 86-35).

The Committee on Standardization of Dimensions and Material of Wrought Iron and Wrought Steel Pipe and Tubing reported that approval by the American Standards Association in November, 1935, of the American Tentative Standard for Wrought Iron and Wrought Steel Pipe, completed its work of the last eight years. The committee has been functioning under the procedure of the American Standards Association, with the American Society of Mechanical Engineers and the A.S.T.M. as sponsors.

With regard to cast iron, the committee handling this subject recommended that the Standard Specifications for Chilled Cast-Iron Wheels (A 46-24), be withdrawn as obsolete and superseded by tentative specifications now under review for revisions. It also reported that it is engaged in the revision of the Tentative Specifications for Cast Iron Culvert Pipe (A 142-35T). Affirmative action was taken upon the recommendation that new Tentative Specifications for Light Gray-Iron Castings be accepted for publication as standard, and that the Tentative Specifications for Gray-Iron Castings, with certain editorial changes, be approved for adoption as standard.

The Committee on Corrosion of Iron and Steel presented progress reports on the various exposure tests being conducted under its direction, and reported that considerable interest had developed in the Tentative Specifications for Electro-deposited Coatings of Zinc on Steel (A 164-35T) adopted in 1935. It also reported that it is actively reviewing the Standard Specifications for Zinc-Coated (Galvanized) Iron or Steel Farm-Field and Railroad Right-of-Way Wire Fencing (A 116-30), with the view of bringing these specifications up to date and in line with improvements in the manufacture of such fencing.

Fifteen reports and papers were presented with regard to non-ferrous metals and metallography, including reference to copper and copper alloy wire, cast and wrought copper and copper alloys, electric furnace alloys, cast and wrought light metals and alloys, aluminum and aluminum alloy sheets, non-ferrous sheet metals, and Monel metal plate. Several tentative specifications were approved for submission to letter ballot, including the following: Specifications for Bronze Castings for Turn-

tables and Movable Bridges; Specifications for Bronze Castings in the Rough for Locomotive Wearing Parts; and Specifications for Car and Journal Bearings.

Cement, Concrete and Other Materials

Twelve papers and reports were presented on cement and concrete and allied subjects, the two of most general interest being the reports on cement and on concrete and concrete aggregates. The report on cement discussed high-early-strength cements, masonry cements, blended cements, portland cements, fineness of cements, plastic mortars, time of setting, chemical analysis, and volume change and soundness. Recommendations made in the report of the Committee on Cement were approved, including revisions of the Tentative Specifications for High-Early-Strength Portland Cement (C 74-30T), involving a new definition, insertion of optional compressive strength requirements and a fineness requirement prescribing a specific surface of not less than 1,900 sq. cm. per gram of cement. A proposed specification for high-early-strength treated portland cement, which was preprinted in the report, was withdrawn by the committee. The only difference between this specification and Specification C 74-30T was in the definition. This feature is to be incorporated in C 74, instead of having a separate specification.

The Committee on Concrete and Concrete Aggregates recommended three new tentative methods of test and tentative definitions of six terms; revision of one tentative standard and three standards; the adoption as standard of four tentative methods of test and one tentative specification; and the adoption as standard of tentative revisions in one standard. Most of the recommendations of the committee had to do with laboratory methods of analysis and testing, although among the newly proposed standards approved were a tentative method of field test for absorption of mixing water by aggregates, and specifications for sodium silicate for curing concrete.

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1926	152	4,461	1,672	111,903	5,266	13,871	7,090	130,235
1927	88	3,893	1,570	88,223	5,334	12,701	6,992	104,817
1928	91	3,468	1,329	70,873	5,260	11,864	6,680	86,205
1929	114	3,846	1,428	60,739	5,148	12,428	6,690	77,013
1930	61	2,666	977	35,872	4,627	10,905	5,665	49,443
1931	46	2,104	677	23,358	4,548	10,209	5,271	35,671
1932	27	1,912	579	17,742	4,299	9,578	4,905	29,232
1933	51	2,067	533	15,932	4,596	9,517	5,180	27,516
1934	38	1,945	556	17,338	4,426	9,358	5,020	28,641
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Decrease, 1935 under 1923								
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Per cent	78.3	66.7	70.4	89.0	11.4	28.6	28.8	83.6

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fatality, while in comparison the number of automobiles to each railroad highway crossing fatality was 15,576, the number per injuries, 5,618, and motor vehicle fatalities upon streets and highways reached the peak of 36,400 fatalities, or one fatality for each 719 automobiles.

A tabulation of casualties at railroad highway crossings included in the report shows that Illinois leads with 226 killed and 447 injured, as compared with 199 killed and 419 injured in Ohio, 143 killed and 318 injured in Indiana, 99 killed and 336 injured in Michigan and 84 killed and 230 injured in New York. None were killed or injured in the District of Columbia, and only one person was killed and five injured in Connecticut, and one person was killed and eight injured in Wyoming.

The committee recommended that individual railroads stress the necessity of train crews and others giving adequate and timely warning to the public of the approach of trains to a crossing, that the standards of protection established by the joint committee on grade crossing protection be employed where necessary to facilitate uniformity and public understanding of signals, that crossings be inspected periodically and maintained in condition for travel with all obstructions to the view removed wherever practicable, and that advantage be taken of the opportunity to address school children and students of colleges and universities on the subject of railroad highway crossing safety.

Employee Safety Record May Decide Job Fitness

In the discussion of this report, reference was made to one of the most interesting programs for reducing trespassing, grade crossing and highway accidents, not only among railroad employees, but among the public as well, inaugurated by the Missouri Pacific. In April of this year the safety department of this road began the formation of employee safety clubs for the purpose of increasing safety among employees, believing that by encouraging safe conduct off duty, particularly while on highways, a reduction in accidents while on duty would naturally result. Co-incident with this movement, chambers of commerce in cities along the Missouri Pacific were asked to enlist industries to include their employees in the plan. Under the plan, safety records are considered in exactly the same light as honesty, sobriety or other similar qualities are considered, as a requisite for continued employment. Each employee is given to understand that any motor vehicle accident upon the streets and highways in which he was engaged while on his own leisure time and not engaged in duties, would seriously reflect upon his value as an employee. It is not the thought that any employee would be definitely dismissed for having an automobile accident, but that his safety record would be given just and proper consideration in determining his fitness for employment.

The formation of the plan is based upon the fact that five times as many workers lose their lives each year in automobile accidents that are in no way connected with their employment as in similar happenings that arise in the course of their work, and that no compensation payments are required for injuries unconnected with employment. On the Missouri Pacific more than 32,000 employees have voluntarily enlisted in these safety clubs.

Train Accidents

The report of the Committee on Train Accidents, of which E. A. Meyer, manager of the safety and fuel department of the Chicago, Milwaukee, St. Paul & Pacific is chairman, showed a total of 6,551 train accidents in 1935, as compared with 6,023 in 1934, resulting in the death of 239 persons and injury to 1,056, in 1935. Of these accidents in 1935, 1,251 were collisions, 4,031 were derailments, 8 were locomotive boiler accidents, 536 were other locomotive accidents and 725 were miscellaneous accidents. As in previous years, the major cause was defects or failures of equipment, while other causes in the order of their frequency were, negligence of employees, miscellaneous and defects in or improper maintenance of way and structures.

Non-Train Accidents

The Committee on Non-Train Accidents, of which F. W. Curtis, supervisor of safety of the Denver & Rio Grande Western is chairman, offered several suggestions for higher standards which will favorably affect casualty rates. These include higher standards in selecting new men, a fresh approach to safety supervision, a practical working plan for obtaining full value from accident investigations and increasing their thoroughness and the preparation of a standard safety code. Of the non-train accidents 8.78 per cent occurred while using hand tools and apparatus, 10.79 per cent were caused by the collapse or fall of objects, 12.73 per cent while handling rails, ties and bridge timbers, 10.84 per cent while handling freight and supplies, and 18.21 per cent were the result of falls of employees.

Train Service Accidents

The Committee on Train Service Accidents of which Chas. E. Hill, general safety agent of the New York Central, is chairman, reported a total of 4,650 employees and non-employees killed and 15,535 injured as compared with 4,396 and 15,446 respectively in 1934. Of the total for 1935, 1,794 persons were killed and 958 were injured by being struck and run over by locomotives or cars, 346 persons were killed and 3,259 were injured while getting on or off locomotives or cars, 11 employees were killed and 845 injured while operating locomotives, 10 employees were killed and 536 injured while operating hand brakes, 16 employees were killed and 264 were injured while coupling or uncoupling cars or locomotives, 12 were killed and 107 were injured while coupling or uncoupling air or steam hose, 48 were killed and 184 were injured while coming in contaxt with fixed structures, 2 were killed and 186 were injured while operating switches, 1,554 were killed and 4,443 were injured in accidents at highway crossings, and 857 were killed and 4,753 were injured in miscellaneous accidents.

Addresses

Addresses made at the meeting dealt with the importance of safety work and suggestions for increasing its effectiveness. Abstracts of three of the addresses are as follows:

Safety Efforts of Railroads Classified

By J. M. Symes

The year 1935 marked the completion of the twelfth year of the Safety Section's organized effort to reduce railway accidents. The accomplishments have been nothing short of remarkable during that period. Because of the great reduction in casualties, lives saved may be numbered in the thousands; non-fatal accidents saved may be expressed in the hundreds of thousands, and economic savings in millions of dollars.

In reviewing the outstanding achievements during this twelve year period, we find that collision frequency, as measured by train miles, was reduced 74 per cent; head-on and rear-end collisions were reduced 82 per cent; derailment frequency declined 64 per cent; and passenger

casualties in train accidents as measured by passenger miles decreased 72 per cent. As is so well known, not a single passenger lost his life in a train collision or derailment during the entire year of 1935. Employee casualties, as measured by man-hours worked, decreased 78 per cent, and there was a marked decrease in casualties to persons in highway grade crossing accidents, notwithstanding the increasing volume of motor traffic moving over railroad tracks.

This splendid showing has only been possible by the untiring efforts of the railroad personnel in this great work, and more particularly by the safety representatives who have directed the work, created the necessary interest and organized competition between various territories and departments, selling the idea that it is just as easy to be careful as it is careless. You have not only had to educate the rank and file in these matters, but railroad officials as well have responded to the urge of your teachings.

While it requires statistical comparisons to prove our accomplishments, it also requires them to prove our weaknesses, and while I have recited some figures to show how good you are it is only fair that I should point to some comparisons that I think might be used as a background for a goal to be accomplished in the future. I have been deeply impressed by the variations in casualty rates as between individual railroad systems. The average casualty rate for all Class I carriers for the year 1935 was 6.79 per million man-hours worked. Thirty-six per cent of these carriers had better casualty rates than the average for the Class I group as a whole, while 64 per cent had higher casualty rates than the average. While it is true that there are certain variable conditions that might enter into such comparisons, nevertheless the hazards of railroad employment, generally speaking, are uniform throughout the country and the figures indicate to me that possibly safety work is not pursued as vigorously on some railroads as on others. Certainly these lines with safety results that do not compare favorably with the average have something to think about and a fertile field for further accomplishments. In order better to illustrate to you the possibilities in this connection, I have segregated the 114 Class I Systems into four groups, which will be designated Groups A, B, C and D:

Group A comprises those systems whose employee casualty rate in 1935 was less than 3.40 per million man-hours; Group B, those with casualty rates between 3.40 and 6.79; Group C, those with casualty rates between 6.80 and 10.19; and Group D, those with casualty rates of 10.20 or over.

We find from this segregation that the railroads in Group A had 7 per cent of the total man-hour exposures with but 2.7 per cent of the casualties. If all Class I railroads had produced such a safety record as those in Group A, there would have been 9,500 fewer casualties in the year 1935. Group B had 53.6 per cent of the total man-hour exposures, with 41.5 per cent of the casualties. If the roads in Groups C and D had produced safety records as good as those in Group B, there would have been 4,000 fewer casualties in 1935. Group C roads had 31 per cent of the man-hour exposures and 36.2 per cent of the casualties. Group D roads had 8.4 per cent of the man-hour exposures and 19.4 per cent of the total casualties. While you might think, when I say to you that all roads should have safety performances as good as the best and that none of these should be worse than the average, that I am considering the ideal rather than the practical, the discrepancies in the performance are of such noticeable proportions that they call for further detailed analysis, study and correction.

When you consider that loss and damage claim payments were reduced from $103,000,000 in 1920 to less than $20,000,000 in 1935, and that payments on account of injuries to persons have been reduced from $40,000,000 to less than half that amount during the same period, no one can dispute that safety pays. However, the amount still being expended from these causes is so great that I do not think any of you need fear working yourselves out of a job.

In closing I would like to call your attention to the relationship between volume of traffic and safety. We are now in a period of increasing traffic, both freight and passenger and I am optimistic enough to feel that these increases are going to continue. This means that you gentlemen have a job to meet in the way of increased hazards. Furloughed men will be coming back into the service, new men will be coming into the service, and they must all be properly instructed in the safe way to perform their daily tasks.

The Association of American Railroads feels very proud of its Safety section and appreciates the efforts of you gentlemen in making it a success. We are looking forward to continued accomplishments in the future just as you have secured them in the past. The new motto of the railroads—"Safety First—Friendliness Next"—must be carried out.

Changing Times Demand Greater Alertness

By Elmer T. Howson

During the last six years we have been passing through a period of the most drastic decline in earnings that the railways have ever experienced—a decline that brought about the separation of three-quarters of a million employees from railway payrolls. As a result, you have been facing the unique situation that all employees have been old employees, experienced in their work and trained in the ways of safety. In this period the new and inexperienced employee has been a rarity—if not non-existent.

Now the reverse is occurring. Traffic is growing; earnings are increasing and the time is almost, if not actually, here when forces must be enlarged to handle the traffic and to restore the roadway and equipment to more nearly normal condition. To a degree, the additional men that will be required will be recruited from furloughed employees. In larger part, however, it will be found that the experienced workmen who were laid off in 1929 have gone into other vocations and are no longer available to the railways. New men must be recruited and they must be recruited in larger numbers than was the practice in pre-depression days, since it is now becoming necessary not only to make good the replacements due to normal retirements and resignations, but also to add materially to the forces employed to build them back to more normal levels.

This change in condition places on you men the very special burden of so co-operating with the officers of the employing departments in the selection and training of these new men that they may not unduly expose themselves or their associates to hazard of accident. And this task will not be an easy one, with so many of your new recruits coming to you after long periods of enforced idleness or of work relief of one kind or another. Furthermore, the improvement in business activity is not confined to the railways, but is found as well in other industries. As a result, we are approaching a period of competition for labor and especially for skilled labor, for few apprentices have been trained in the last decade and

all industry is suddenly facing the need for experienced men when there are few to be had.

Nor are the changes in your problems confined to conditions growing out of the reversal in the trend in traffic. They are even more pronounced in the character of the service that is now being introduced by the railways. We are in an era of rapid change today. Streamlined trains that cut entire days from travel schedules—air-conditioned cars that surpass one's own hope for comfort—freight trains that run on passenger train schedules—trucks that call for and deliver your freight—all these typify changes in railway practices of the most revolutionary character. No longer are the railways the sole agency of transportation; on the contrary, they are being harassed on every side by competitors on the highways, on the waterways, in the air. As a result, they are being forced to extend their service in many directions not heretofore thought of as within the scope of railway transportation.

To meet the competition of highway transportation agencies, the railways are developing with great rapidity a pick-up and delivery service for freight, handled in part by contract truckers, but in part also by trucks operated directly by railway employees. Closely akin to this service is the rapid extension of railway-owned bus and truck service on the highways, a form of service which, although of the last few years, already comprises some 11,000 employees in wholly-owned railway subsidiaries, operating and maintaining 1,200 buses and 4,500 trucks on the highways. This development, although as yet confined to a limited number of railways, is but the forerunner of a completely co-ordinated rail-highway service. Employees engaged in this service are just as directly railway employees as those on the right of way. Their safety becomes your problem. Their activities expand and diversify your problem.

Likewise, we are now in the initial stages of a new era of transportation with respect to speed. Schedules are being cut in all parts of the country. While these schedules do not require maximum speeds much higher than those which have prevailed on most roads for some time, they do require the maintenance of these speeds for long distances. On runs between Chicago and Denver, for instance, these new trains are required to maintain average speeds in excess of 65 miles per hour for the entire distance of more than 1,000 miles, a requirement which necessitates sustained speeds up to 90 miles per hour for long distances.

Such speeds require refinements in track and equipment maintenance and in operating practices, and a degree of alertness in employees not heretofore demanded. They place on you the new and added responsibility of insuring that every employee concerned with these new services be keyed up to his new responsibilities and that no precautions be overlooked.

In some respects these higher speeds require changes in long established practices. They require changes in roadway construction, especially as regards the reduction of curvature. They necessitate a higher degree of maintenance of equipment. They also create new or intensify old problems in the control of accidents involving non-employees, especially the highway traveler at the grade crossing. That these new trains have made an enviable record in safety to date is eloquent tribute to the basic training in safety which you gentlemen have so thoroughly implanted in the minds of the rank and file of railway men. Yet you cannot afford to relax in your campaigns for a moment in these days when the demand for speed and more speed is increasing the tension under which so many railway men are working.

Another development of concern to you is the steadily increasing use of mechanical equipment for many operations formerly performed manually. This development is most pronounced in the maintenance of way department. While it has been under way for 10, and in some instances for 15 years, it is still expanding rapidly, both with respect to the development of new machines and with respect to the extension of the use of old machines on additional lines, with the result that the safety officer is facing added responsibilities as this equipment is turned over to gangs previously inexperienced in their operation.

There is still another phase of your problem to which I desire to call your attention, a phase which, while temporary, warrants your close attention for the next year or two. This is the problem created by the necessity for cutting expenditures of all kinds to the bone during the last six years. This has led to retrenchments in maintenance of way and equipment of the most drastic character. In part, the necessary savings have been effected by deferring those expenditures that affected appearance more directly than safety, as for illustration, painting. But it is too much to expect that tie renewals can be cut in half for five consecutive years, that rail renewals can be cut to an even greater degree and that equipment maintenance can be reduced similarly without drawing down at least some of the reserve strength that had been built into the properties during the more prosperous days of 1923-1929. I am not implying that the railways as a whole have reached or even approached the limit of safety, their record for the last year belies that. However, the trend for the last six years has been such as to warrant your consideration of this phase of your problem until such time as funds are available for more liberal maintenance. Fortunately, the end appears to be in sight, for with the continuation of the improvement in earnings that has prevailed during recent months, funds will soon be available to make good the wear and tear of the recent past.

The railway industry is moving forward today with more vigor than it has shown for a generation. I am sure that you will meet the challenge of the new day in transportation by insuring that the advances that the railways are making in so many directions shall be made without the least retrogression in safety. Your work has given the railways their strongest argument. They cannot afford to sacrifice this advantage in the least degree, for speed or other developments that are now being offered.

Investigation Essential to Improvement

By W. J. Patterson

Up to the first of this month the percentage of accidents due to equipment failures, as compared with the total number investigated, was 15.6 per cent. Only once during the past decade has the percentage been as much as 10 per cent, that time having been in the 1933 fiscal year, when nearly 17 per cent of the accidents investigated involved failures of equipment. During 1927 and 1928, less than 4 per cent involved accidents of this character, but during the past five years, figures for the current month not being available, the average has been nearly 12 per cent.

I can well appreciate the fact that in these days of economy, with their attendant results of consolidated divisions, increased territories to be covered by individual officers, and reduced appropriations, it is very difficult to provide the proper degree of supervision and inspection, and under such circumstances it is all the more remarkable that in the calendar year of 1935, the

NEWS

Five Months Rail Net a 2.17 Per Cent Return

$187,931,355 compares with $160,673,752 or 1.85 per cent in same period last year.

Class I railroads for the first five months of 1936 had a net railway operating income of $187,931,355, which was at the annual rate of return of 2.17 per cent on their property investment, according to the Bureau of Railway Economics of the Association of American Railroads. In the first five months of 1935 their net was $160,673,752 or 1.85 per cent on their property investment.

Gross operating revenues for the first five months of 1936 totaled $1,542,237,353 compared with $1,354,207,876 for the same period in 1935, an increase of 13.9 per cent; operating expenses amounted to $1,179,569,875 compared with $1,043,395,594, an increase of 13 per cent.

Class I railroads in the first five months of 1936 paid $121,825,928 in taxes compared with $100,861,270 in the same period in 1935, or an increase of 20.8 per cent. For May alone, the tax bill amounted to $27,403,968, an increase of $6,647,520 or 32 per cent above the same month in 1935.

Thirty Class I railroads failed to earn expenses and taxes in the first five months of 1936, of which 9 were in the Eastern district, 5 in the Southern and 16 in the Western district.

Class I roads for May had a net railway operating income of $41,842,147 which, for that month, was at the annual rate of return of 2.13 per cent. In May, 1935, their net was $39,598,511 or 2.01 per cent.

Gross operating revenues for May amounted to $320,966,498 compared with $279,527,573 in May, 1935, an increase of 14.8 per cent. Operating expenses in May totaled $240,233,615 compared with $209,260,315 in the same month of 1935, or an increase of 14.8 per cent.

Class I roads in the Eastern District for the five months had a net of $131,502,944, at the rate of 2.98 per cent. For the same period in 1935, their net was $115,358,561 or 2.61 per cent. Gross operating revenues in the East for five months totaled $797,526,174, an increase of 12.8 per cent, compared with 1935, while operating expenses totaled $580,611,657, an increase of 12.2 per cent. Class I roads in the Eastern district for May had a net of $30,381,333, compared with $24,648,598, in the same month in 1935.

Class I railroads in the Southern District for the five months had a net of $27,683,018, at the rate of 2.05 per cent. For the same period in 1935, their net amounted to $20,892,736, or 1.53 per cent. Gross operating revenues in the Southern district for the first five months amounted to $201,542,619, an increase of 12.9 per cent compared with the same period in 1935, while operating expenses totaled $153,020,283, an increase of 9.3 per cent. Class I roads in the Southern district for May had a net of $5,011,440 compared with $2,931,949 in May 1935.

Class I roads in the Western district for five months had a net of $28,745,393, a return of one per cent. For the same five months in 1935, the railroads in that district had a net of $24,422,455, or 0.85 per cent. Gross operating revenues in the Western district for the five months amounted to $543,168,560, an increase of 16 per cent above the same period in 1935, while operating expenses totaled $445,937,935, an increase of 15.6 per cent. For May the Class I roads in the Western district reported a net railway operating income of $6,449,374 compared with $12,017,964 for the same roads in May of last year.

CLASS I RAILROADS—UNITED STATES

	1936	1935	Per Cent of Increase
Month of May			
Total operating revenues	$320,966,498	$279,527,573	14.8
Total operating expenses	240,233,615	209,260,315	14.8
Taxes	27,403,968	20,756,448	32.0
Net railway operating income	41,842,147	39,598,511	5.7
Operating ratio—per cent	74.85	74.86	
Rate of return on property investment—per cent	2.13	2.01	
Five Months Ended May 31			
Total operating revenues	$1,542,237,353	$1,354,207,876	13.9
Total operating expenses	1,179,569,875	1,043,395,594	13.0
Taxes	121,825,928	100,861,270	20.8
Net railway operating income	187,931,355	160,673,752	17.0
Operating ratio—per cent	76.48	77.05	
Rate of return on property investment—per cent	2.17	1.85	

Low Fares in East Bring Revenue Gains for June

Several roads report increases as compared with the same month last year

That the reduced passenger fares are bringing increased revenue as well as additional traffic to Eastern railroads is indicated in preliminary reports and estimates of the business done by some of the larger passenger carriers in that territory during June, the first month in which the new rates were effective. Also, the July 4 holiday travel was described by passenger traffic officers as "tremendous" in volume.

The New York Central's preliminary reports indicate that its passenger revenue in June was 6.3 per cent in excess of that for June, 1935. This road has not yet compiled figures on the comparative number of passengers carried. Its July 4 holiday business was described as very good but definite figures were not available when this issue went to press.

The Baltimore & Ohio reports that the increases in passenger revenue which it experienced early in June persisted throughout the month. The latest available figures for the New York area show that this road since the reduction has in that territory enjoyed a 41 per cent increase in passenger traffic and a 26 per cent increase in revenue as compared with 1935. This increase has been reflected in both coach and Pullman travel and it was necessary to add extra coaches and Pullmans to virtually all B. & O. trains out of New York during the month.

While the New York, New Haven & Hartford has not yet compiled definite figures, it estimates that its June passenger revenue was "slightly ahead" of that for June, 1935. It experienced a substantial increase in business during the early part of the month but the extent of the gain has not been so great in recent weeks. Its holiday business, however, was greatly in excess of last year, due in part, it was said, to the fact that July 4 fell on a Saturday this year.

The Delaware, Lackawanna & Western estimates that its June revenues were about 6 per cent above June, 1935, and its traffic was up 50 to 75 per cent. These figures are exclusive of traffic in New Jersey suburban territory where fares at less than two cents a mile had been in effect before the general reduction. In May, the month before the fare reduction, this road reported an 8 per cent increase in passenger

(*Continued on page 86*)

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Nor are the changes in your problems confined to conditions growing out of the reversal in the trend in traffic. They are even more pronounced in the character of the service that is now being introduced by the railways. We are in an era of rapid change today. Streamlined trains that cut entire days from travel schedules—air-conditioned cars that surpass one's own hope for comfort—freight trains that run on passenger train schedules—trucks that call for and deliver your freight—all these typify changes in railway practices of the most revolutionary character. No longer are the railways the sole agency of transportation; on the contrary, they are being harassed on every side by competitors on the highways, on the waterways, in the air. As a result, they are being forced to extend their service in many directions not heretofore thought of as within the scope of railway transportation.

To meet the competition of highway transportation agencies, the railways are developing with great rapidity a pick-up and delivery service for freight, handled in part by contract truckers, but in part also by trucks operated directly by railway employees. Closely akin to this service is the rapid extension of railway-owned bus and truck service on the highways, a form of service which, although of the last few years, already comprises some 11,000 employees in wholly-owned railway subsidiaries, operating and maintaining 1,200 buses and 4,500 trucks on the highways. This development, although as yet confined to a limited number of railways, is but the forerunner of a completely co-ordinated rail-highway service. Employees engaged in this service are just as directly railway employees as those on the right of way. Their safety becomes your problem. Their activities expand and diversify your problem.

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Such speeds require refinements in track and equipment maintenance and in operating practices, and a degree of alertness in employees not heretofore demanded. They place on you the new and added responsibility of insuring that every employee concerned with these new services be keyed up to his new responsibilities and that no precautions be overlooked.

In some respects these higher speeds require changes in long established practices. They require changes in roadway construction, especially as regards the reduction of curvature. They necessitate a higher degree of maintenance of equipment. They also create new or intensify old problems in the control of accidents involving non-employees, especially the highway traveler at the grade crossing. That these new trains have made an enviable record in safety to date is eloquent tribute to the basic training in safety which you gentlemen have so thoroughly implanted in the minds of the rank and file of railway men. Yet you cannot afford to relax in your campaigns for a moment in these days when the demand for speed and more speed is increasing the tension under which so many railway men are working.

Another development of concern to you is the steadily increasing use of mechanical equipment for many operations formerly performed manually. This development is most pronounced in the maintenance of way department. While it has been under way for 10, and in some instances for 15 years, it is still expanding rapidly, both with respect to the development of new machines and with respect to the extension of the use of old machines on additional lines, with the result that the safety officer is facing added responsibilities as this equipment is turned over to gangs previously inexperienced in their operation.

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By W. J. Patterson

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I can well appreciate the fact that in these days of economy, with their attendant results of consolidated divisions, increased territories to be covered by individual officers, and reduced appropriations, it is very difficult to provide the proper degree of supervision and inspection, and under such circumstances it is all the more remarkable that in the calendar year of 1935, the

railroads were able to operate without a fatality to a passenger in a collision or derailment. The part which is played in the safety movement by instruction in the rules and their enforcement, and by inspection and test with a view to seeing that the facilities and equipment provided for the conduct of the railroad's business are in the safest possible condition is apparent. I sincerely hope that in the recovery of business, the railroads will give necessary attention to their supervisory and inspection forces since they constitute a first line of defense, and a railroad which has adequate and well-organized forces of this character has less to fear so far as safety of operation is concerned.

Investigations Should Probe Causes

Too often investigation appears to be directed primarily toward the placing of blame upon one or more employees and applying discipline rather than to determine and correct the cause. During the past 15 years the Bureau of Safety has investigated a number of accidents in which motor vehicles of various kinds were involved, and in those accidents it has been necessary for us to investigate the highway side of the case as well as the railroad side of it. In some of these cases, even where there was a large loss of life, investigation by the local authorities often did not go beyond determination of the question of criminal responsibility. Too much importance cannot be given to the investigation of transportation accidents, regardless of the type of transportation involved, for the purpose of definitely locating any weak points in the system, whether rules, inspection, facilities, or personnel, thus affording an opportunity to take proper steps to prevent a recurrence.

In connection with this subject of investigation, there is another point to which I wish to direct your attention and that is the compilation of complete and accurate statistics. Before full benefit can be obtained from such statistics, we must first have a complete record of all accidents, regardless of their severity, and the only way in which this can be accomplished is by having all accidents reported and classified. Under the Interstate Commerce Commission's regulations, it has been the practice not to require accident reports in case injury to an employee does not incapacitate him from duty for more than 3 days in the succeeding 10 days. There is now in effect, however, a temporary order of the commission requiring records to be kept concerning all employee injuries resulting in disability beyond the day or shift on which the accident occurred. The field force of the Bureau of Safety has checked the records of several carriers with a view to ascertaining how the records are being kept, and what information they contain. In connection with this work reports have been filed in my office concerning cases in which it appears that erroneous information with respect to duration of disability has been shown by some carriers, and examination of the data thus obtained indicates that in some instances the records do not reflect the true situation.

Straining a Point on Reportable Injuries

Apparently some of the carriers have been so anxious to reduce the number of reportable injuries that they have frequently strained a point to classify an accident as unreportable when the contrary clearly was the case. We find many instances of injured employees being assigned to other and lighter duties than those in which they were customarily engaged, thereby allowing the employee to be shown as having returned to duty earlier than would have been the case had he not returned until he could perform his usual duties, or the duties in which engaged at the time of the injury. Full advantage often has been taken of Sundays and holidays, these not being computed in calculating the period of incapacity when such holidays happen to fall immediately after the expiration of the three-day period. Again, there is evidence to indicate that some of the unreported injuries classified as not incapacitating the employee were of a more serious nature than some of those which actually resulted in incapacity, while the number of injuries reported under the temporary order as resulting in less than three days' disability, as compared with the total number of injuries, has shown a very great variation between railroads, amounting to several hundred per cent in some cases.

At your Cleveland meeting in 1934, a statement was made which indicated that on one railroad a change in the person who made the accident reports to the Interstate Commerce Commission resulted within a few years in a decrease of injuries to employees of 88 per cent, while another safety officer managed to secure a 42 per cent decrease in one year. When I note reported instances that discipline is assessed against an employee because he is injured, with the incentive it offers to employees to conceal injuries so far as possible in order to avoid discipline, I cannot escape the conclusion that the true story with respect to accidents and safety has not as yet been fully told.

Engineers and Scientists Discuss Materials at Atlantic City

(*Continued from page 75*)

fications for Structural Wood Joint and Planks, Beams and Stringers, and Post and Timbers, were also approved for submission to letter ballot.

In connection with brief progress reports of Committee D-19, on Water for Industrial Uses, and of the Joint Research Committee on Boiler Water Studies, several technical papers were presented, including one on the "Effect of Solution Composition on the Failure of Boiler Steel Under Static Stress at 250 deg. C.," and another entitled "The Use of Solubility Data to Control the Deposition of Sodium Sulfate or its Complex Salts in Boiler Waters." Both of these papers had to do largely with the effect of the chemical constituents of boiler water on the embrittlement and cracking of boiler steel. The Committee on Water announced that during the year it proposes to publish as information four methods of analysis of water for industrial uses.

Other reports and papers presented at the meeting, of largely indirect interest to the railways, included a number with regard to fuels, protective coatings, electrical insulating materials and radiography. An extended symposium was presented on radiography and related subjects, having to do with the non-destructive testing or inspection of materials for internal flaws or failures, employing the X-ray.

The Institution of Railway Signal Engineers, headquarters at Reading, England, has issued Part 2 of its Proceedings for 1935-36. The first seven pages contain a report of the annual dinner, held on October 25. Other articles cover four meetings: October 9, comparison between mechanical and electrical interlocking; November 20, standardization of methods and practice; December 18, switching of block sections; January 22, mechanical signaling apparatus.

New Books...

Proceedings Division V—Mechanical, Association of American Railroads. Published by the Association, 59 East Van Buren street, Chicago. 1,090 pages. Price, $5 to members; $10 to non-members.

The proceedings of the Division V—Mechanical just issued by the Association of American Railroads, Operations and Maintenance Department, for the session held at the Congress Hotel, Chicago, June 26 and 27, 1935, contain also recommendations, letter ballots and other transactions for the years 1933 and 1934, during which years no member meetings were held because of prevailing business conditions.

Developing America's Waterways, by Marshall E. Dimock. 123 pages, 8½ in. by 5¼ in. Illustrated. Bound in cloth. Published by the University of Chicago Press, Chicago. Price $1.50.

The author of this study believes that the problem of co-ordinating the country's transportation services on a sound basis will remain unsolved until government-controlled corporations own and operate the principal carriers in the rail, highway and waterway fields. Considering, as he puts it, that the Inland Waterways Corporation "is already organized in this manner," his sympathetic approach to this survey of that agency's organization and activities is readily understandable. Waterway transportation emerges, in his view, as a "cheap" method of carriage which should be encouraged, and the Federal Barge Line, while criticized in some details of organization and methods, becomes a proper government agency, which, having completed its "developmental and promotional" period, may now "be expected to improve its own housekeeping and to settle down to regular service over a completed system which needs to be operated in as efficient a fashion as possible."

Approximately one-third of the book is devoted to a discussion of "The Economics of River Transportation." Coming to grips here with the studies of Dr. Harold G. Moulton and the Bureau of Railway Economics, which found that, if "hidden" costs be considered, inland waterway transportation is rarely as economical as rail, Professor Dimock concentrates his main attack on the allowance for "circuity" of water routes. Such allowance he calls "the joker in the pack"—a "legerdemain which vitiates the conclusion" because it increases "the tolls, the interest on investment and every other item which has been adopted as an element of cost." But the author need not have so concerned himself with the implications of the Moulton and Bureau studies, since, by the process of citing beneficiaries other than carriers, he had already discarded carrying charges on virtually all waterway expenditures as improper charges on navigation. There are the considerations of flood control, which benefits railroads, farmers and other owners of property adjacent to rivers, but which may hinder navigation; then there are the requirements of national defense. Also, the "you, too" argument of land grants to railroads is advanced, without reference, however, to the land-grant rates, which the government still enjoys, or to the enhancement in values which railroad penetration brought to public holdings not assigned to the carriers.

All of which raises in the author's mind the question as to whether "most if not all of Congress' expenditures on river improvements" might not be "ruled out of the picture so far as the proper costs of inland waterway transportation is concerned"—unless "the only purpose is to assist the competitive position of the railways at the cost of more economic water rates." Finally, as if to clinch the case for water transport, comes the suggestion that, even if barge-line costs be not sufficiently lower than those of railways to attract a paying business, a subsidy to the former would be justified "as sound national policy"—to get water carriers re-established, as a measure of national defense, and "on the same grounds" as subsidies to the merchant marine are justified.

As stated above, several features of the Inland Waterways Corporation organization and activities are criticized and changes recommended. Some of these recommendations have been adopted since the completion of the original study, as explained in a "Postscript" included in the book. The University of Chicago was invited to undertake the study by Secretary of War Dern who requested that the report be a confidential one. The assignment was accepted on that basis but Secretary Dern later authorized publication. If he has not yet adopted the recommendation that the Inland Waterways Corporation give up its post office frank, he might profitably employ that free-mailing privilege in sending out copies of this book.

Co-ordinated Rate Guide. Over 800 pages, 10¾ in. by 13¾ in. Bound in cloth. Published by the Consolidated Guide Corporation, 153 N. Michigan Ave., Chicago, Ill. Price $15 annually, including advisory and rate change service. Published semi-annually.

Co-ordinated Rate Guide tabulates rail, express, water, truck, parcel post and air rates under one cover for the convenience of shippers and transportation agencies and in a much simpler and more understandable form than tariffs. The tabulation of the rates of these forms of transportation in the same column is designed to afford easy comparison by shippers and transportation agencies. The material in the guide is so arranged that rates, percentages, divisions of rates, invoices and discounts can be computed with facility by the average shipper and traffic solicitor.

The guide is published each September and March and rate changes occurring during the interim are sent to subscribers prior to their effective date. These changes are printed on glued paper, so that the "ready reference" feature of the guide may be preserved by pasting the new information over the obsolete data. Distribution of the guide is enhanced by circulation offices located in major cities.

In its application, the guide covers 108 points of origin, 88,000 destinations and approximately 35,000,000 first-class rates, and with the use of rate scales approximately 2,000,000,000 class rates. In addition it can be used for the computation of commodity rates when there is a definite relation to class rates.

The guide is divided into six major sections. In the first section are shown the first class rail rates of official classification, truck rates of truck publishing agents, express rates and parcel post rates, as shown in the illustration. Air and water rates are shown in another section.

Illustration from Section One

	To Illinois Cities			
	Beardstown	Beecher	Belle River	Belleville
From	O 76	O 40	O 87	O 84
Chicago,	E 76	E 40	E 87	E 84
Ill.	X185	X100	X185	X205
	P 84	P 84	P147	P147

O—Official classification rate in cents per 100 lbs.
E—Eastern truck rate in cents per 100 lbs.
X—Express rate in cents per 100 lbs.
P—Parcel post rate in cents per 70 lbs.

The data are arranged by states. Across the top of the page are the destination cities of the states. In the left column are the 108 key originating cities of the United States, listed alphabetically.

Section two is devoted to first-class rail rates from additional key towns. Destination cities are shown across the top of the page and originating alphabetically according to states in the left column.

Section three is a tabulation of rates and factors to be used in making combination rates when no through rates are in effect. It is used in combination with section one. Origins are shown across the top of the page and destinations in the left column.

Section four is a classification and percentage rating table. In it are shown class rates, from first to twelfth, according to official, Illinois, Western and Southern classifications. Percentages of the first-class rates also are shown. This scale is so arranged that it can also be used to figure commodity rates, percentages, and division of rates, and to compute invoices and discounts.

Section five is a listing of transportation companies. When railroads are listed the executives and freight traffic officers, with their addresses, are shown while under truck and air line listings are included the location of the main and branch offices, the officers, the insurance carried and the number of pieces of equipment. Section six includes air and water rates. Other sections are devoted to explanations, a United States mileage chart, and other information.

NEWS

Five Months Rail Net a 2.17 Per Cent Return

$187,931,355 compares with $160,673,752 or 1.85 per cent in same period last year.

Class I railroads for the first five months of 1936 had a net railway operating income of $187,931,355, which was at the annual rate of return of 2.17 per cent on their property investment, according to the Bureau of Railway Economics of the Association of American Railroads. In the first five months of 1935 their net was $160,673,752 or 1.85 per cent on their property investment.

Gross operating revenues for the first five months of 1936 totaled $1,542,237,353 compared with $1,354,207,876 for the same period in 1935, an increase of 13.9 per cent; operating expenses amounted to $1,179,569,875 compared with $1,043,395,594, an increase of 13 per cent.

Class I railroads in the first five months of 1936 paid $121,825,928 in taxes compared with $100,861,270 in the same period in 1935, or an increase of 20.8 per cent. For May alone, the tax bill amounted to $27,403,968, an increase of $6,647,520 or 32 per cent above the same month in 1935.

Thirty Class I railroads failed to earn expenses and taxes in the first five months of 1936, of which 9 were in the Eastern district, 5 in the Southern and 16 in the Western district.

Class I roads for May had a net railway operating income of $41,842,147 which, for that month, was at the annual rate of return of 2.13 per cent. In May, 1935, their net was $39,598,511 or 2.01 per cent.

Gross operating revenues for May amounted to $320,966,498 compared with $279,527,573 in May, 1935, an increase of 14.8 per cent. Operating expenses in May totaled $240,233,615 compared with $209,260,315 in the same month of 1935, or an increase of 14.8 per cent.

Class I roads in the Eastern District for the five months had a net of $131,502,944, at the rate of 2.98 per cent. For the same period in 1935, their net was $115,358,561 or 2.61 per cent. Gross operating revenues in the East for five months totaled $797,526,174, an increase of 12.8 per cent, compared with 1935, while operating expenses totaled $580,611,657, an increase of 12.2 per cent. Class I roads in the Eastern district for May had a net of $30,381,333, compared with $24,648,598, in the same month in 1935.

Class I railroads in the Southern District for the five months had a net of $27,683,018, at the rate of 2.05 per cent. For the same period in 1935, their net amounted to $20,892,736, or 1.53 per cent.

Gross operating revenues in the Southern district for the first five months amounted to $201,542,619, an increase of 12.9 per cent compared with the same period in 1935, while operating expenses totaled $153,020,283, an increase of 9.3 per cent. Class I roads in the Southern district for May had a net of $5,011,440 compared with $2,931,949 in May 1935.

Class I roads in the Western district for five months had a net of $28,745,393, a return of one per cent. For the same five months in 1935, the railroads in that district had a net of $24,422,455, or 0.85 per cent. Gross operating revenues in the Western district for the five months amounted to $543,168,560, an increase of 16 per cent above the same period in 1935, while operating expenses totaled $445,937,935, an increase of 15.6 per cent. For May the Class I roads in the Western district reported a net railway operating income of $6,449,374 compared with $12,017,964 for the same roads in May of last year.

CLASS I RAILROADS—UNITED STATES

	1936	1935	Per Cent of Increase
Month of May			
Total operating revenues	$320,966,498	$279,527,573	14.8
Total operating expenses	240,233,615	209,260,315	14.8
Taxes	27,403,968	20,756,448	32.0
Net railway operating income	41,842,147	39,598,511	5.7
Operating ratio—per cent	74.85	74.86	
Rate of return on property investment—per cent	2.13	2.01	
Five Months Ended May 31			
Total operating revenues	$1,542,237,353	$1,354,207,876	13.9
Total operating expenses	1,179,569,875	1,043,395,594	13.0
Taxes	121,825,928	100,861,270	20.8
Net railway operating income	187,931,355	160,673,752	17.0
Operating ratio—per cent	76.48	77.05	
Rate of return on property investment—per cent	2.17	1.85	

Low Fares in East Bring Revenue Gains for June

Several roads report increases as compared with the same month last year

That the reduced passenger fares are bringing increased revenue as well as additional traffic to Eastern railroads is indicated in preliminary reports and estimates of the business done by some of the larger passenger carriers in that territory during June, the first month in which the new rates were effective. Also, the July 4 holiday travel was described by passenger traffic officers as "tremendous" in volume.

The New York Central's preliminary reports indicate that its passenger revenue in June was 6.3 per cent in excess of that for June, 1935. This road has not yet compiled figures on the comparative number of passengers carried. Its July 4 holiday business was described as very good but definite figures were not available when this issue went to press.

The Baltimore & Ohio reports that the increases in passenger revenue which it experienced early in June persisted throughout the month. The latest available figures for the New York area show that this road since the reduction has in that territory enjoyed a 41 per cent increase in passenger traffic and a 26 per cent increase in revenue as compared with 1935. This increase has been reflected in both coach and Pullman travel and it was necessary to add extra coaches and Pullmans to virtually all B. & O. trains out of New York during the month.

While the New York, New Haven & Hartford has not yet compiled definite figures, it estimates that its June passenger revenue was "slightly ahead" of that for June, 1935. It experienced a substantial increase in business during the early part of the month but the extent of the gain has not been so great in recent weeks. Its holiday business, however, was greatly in excess of last year, due in part, it was said, to the fact that July 4 fell on a Saturday this year.

The Delaware, Lackawanna & Western estimates that its June revenues were about 6 per cent above June, 1935, and its traffic was up 50 to 75 per cent. These figures are exclusive of traffic in New Jersey suburban territory where fares at less than two cents a mile had been in effect before the general reduction. In May, the month before the fare reduction, this road reported an 8 per cent increase in passenger

(*Continued on page 86*)

Safety Rules for Highway Motor Carriers Proposed

I.C.C. bureau solicits criticism and comment on regulations which it has devised

The Bureau of Motor Carriers of the Interstate Commerce Commission has released for criticism and comment proposed rules and regulations to promote the safety of bus and truck operation in interstate commerce by common and contract motor carriers subject to the motor carrier act, 1935. These proposed rules and regulations have not yet been considered by the commission. The proposed regulations are being submitted to large numbers of organizations and individuals for comment and criticism, and may be revised in the light of such comment and criticism before submission to the commission for its consideration.

These proposals represent the first entry of the federal government into regulation of highway safety from an operation standpoint. It is estimated that the proposed regulations would be applicable to approximately 300,000 vehicles operated by common and contract motor carriers in all parts of the country. In this connection the views of interested parties are sought as to the propriety of the Bureau recommending to the commission that these rules and regulations be made applicable to private motor carriers subject to the motor carrier act.

These proposed safety provisions are regarded as of great importance, for their effect may be expected to extend far beyond the scope of their immediate application and ultimately to promote greater safety over the whole field of motor vehicle operation.

The Bureau of Motor Carriers consulted 23 organizations and several hundred individuals in its preliminary investigations, and the proposed regulations are based upon the best practices now existing in many states and in the business of leading bus and truck operators who have made outstanding safety records.

The bureau expects that the proposed regulations, if adopted by the commission, will promote uniformity so far as the interstate vehicles affected are concerned. Officials of many states, both individually and through their national organizations, have co-operated with the Bureau of Motor Carriers in its effort to establish sound and effective rules.

With the general objective of "decreasing accidents, saving human lives, and reducing property losses," the proposals are presented under three main headings—control of the driver, control of the vehicle, and the reporting of accidents. A long-term program may be necessary to accomplish this objective, it is stated, including such elements as minimum qualifications, medical examinations, and licensing of drivers, with driving rules, limitations on hours of service, and promotion of driving skill; requirements as to parts and accessories of motor vehicles necessary for safe operation, standards for inspection and maintenance, and consideration of the factors of motor vehicle size and weight; and detailed reports as to highway accidents in order to evolve further means for accident prevention.

The bureau states that a safety structure of this magnitude will take considerable time to build. It is proposed that in 1936 the following items, which may be regarded as a foundation, will be completed: (1) Qualifications of drivers and filing of information regarding drivers; (2) regulations regarding the driving of motor vehicles; (3) certain parts and accessories necessary for safe operation; and (4) reporting of accidents.

Eastern Car Foreman's Association Annual Outing

The program for the fourth annual golf tournament and field day of the Eastern Car Foreman's Association to be held on Thursday, July 23, at the Race Brook Country Club, New Haven, Conn., includes the usual set-up of golf and field events. Also included on the program are dinner, bridge and a "grand mystery drawing for prizes."

In the golf tournament, open to members and guests, eight prizes will be awarded—one for low gross and low net in each of three handicap classes, a kickers' prize and another for low gross. Prizes will also be awarded for each of several other events, including the putting contest for golfers, the putting contest for non-golfers, quoits, and bridge.

F. H. Becherer, general chairman of the committees in charge of the outing, is being assisted by two vice-chairmen—A. E. Calkins and R. Sonquist. Other committees, together with their respective chairmen, are: General, F. C. Heinen; reception, H. P. Cook; golf, John Schlintz; arrangements, J. P. Egan; publicity and tickets, T. P. O'Brian; Boston tickets, W. E. Cade, Jr.; prizes, F. H. Reynolds; quoits, D. F. Evans; bridge, F. C. Dunham; putting greens, D. B. Carse, Jr.; transportation, T. G. Case.

Superintendents Select 1937 Convention Date

At a meeting of the executive committee of the American Association of Railroad Superintendents on July 7, it was decided that the next annual convention shall be held in Chicago on June 15-17, 1937.

Annual Meeting Fire Protection Association

The twenty-third annual meeting of the Railway Fire Protection Association will be held at the Congress Hotel, Chicago, on October 20 and 21.

Locomotive Inspector Wanted

The United States Civil Service Commission, Washington, is to hold competitive examinations at various places, for the position of inspector of locomotives, under the Interstate Commerce Commission, at $4,000 a year; applications to be in not later than July 20. All competitors must attain in the whole examination an eligible average of at least 70. There are numerous variations, based on preferences granted for military service, etc.

Close New York Hearings on Eastern C. & D. Tariffs

More truck operators and shippers heard—Chicago sessions open on July 21

New York hearings in connection with the Interstate Commerce Commission's investigation of suspended storedoor pick-up and delivery tariffs of Eastern railroads were concluded on July 2. The hearings, which are being conducted by Examiners Archer and Hosmer, will be resumed at Chicago on July 21. Testimony of all but the last few witnesses at the New York sessions was reported in the *Railway Age* of July 4, which covered the presentations of the Port of New York Authority and the Merchant Truckmen's Bureau of New York as well as those of representatives of over-the-road truckers, the Brooklyn, N. Y., contract terminals and trucking labor.

These were followed by representatives of New Jersey and Pennsylvania trucking interests, the former complaining that they had lost cartage business because of the present collection and delivery services of the Erie and Pennsylvania, and the latter assuming a neutral position as to the performance of c. & d. service by railroads, but asking that the allowance to shippers electing to take station-to-station service be sufficient to permit the employment of local truckmen at a compensatory rate. Testimony in opposition to the proposed tariffs was offered by a representative of the Consolidated Truckmen's Association of Brooklyn, and by Hugh Sheridan, a New York truckman and former president of the Merchant Truckmen's Bureau of New York.

William E. Gaillard, chairman of the industrial property committee of the National Association of Real Estate Boards, favored c. & d. because it would increase the demand for off-track industrial sites.

At the final New York session Fred Carpi, general freight agent of the Pennsylvania, testified briefly to introduce some l. c. l. drayage cost figures which had been requested by counsel for some of the protestants. The average cost on the Pennsylvania system as a whole Mr. Carpi gave as 6.15 cents per 100 lb. He was followed by the two final witnesses who were presented by the Port of New York Authority.

The first of these—David Levy, traffic manager of the United Merchants & Manufacturers, Inc., which operates five shipping offices in Manhattan,—favored storedoor service but expressed no opinion as to the proposed allowance to shippers. Mr. Levy also expressed the hope that the c. & d. service, if installed, would be adequate to the shipper's needs and efficiently performed. The last witness was Thomas J. Farley, who is in charge of trucking for Eimer & Amend, chemical manufacturers. He was not opposed to c. & d. in principle, but said that the nature of his firm's business is such that it uses several railroads each day and it would continue to do its own trucking in any event. It would, however, accept the allowance if given at the Union Inland Freight Station located

in the Port Authority Commerce Building. By using this facility Eimer & Amend trucks have been able to save two to three hours a day in their handling of the firm's l. c. l. shipments.

Another R. C. C. Distribution

The Railroad Credit Corporation will on July 15, make a further distribution of $1,447,020, or two per cent to participating carriers. Of this amount $803,222 will be paid in cash and $643,798 will be credited on carriers' indebtedness to the Corporation. This will bring the total amount distributed to $38,976,936, or 53 per cent of the fund.

N.Y.C. Wins Damages from Truck

The United States Court of Appeals at Toledo, Ohio, on June 29, upheld the verdict of a jury awarding the New York Central $3,090 for damages to the Twentieth Century Limited which was struck by a 6-ton truck carrying 12 tons of steel, on May 28, 1933. The court, in its opinion, called attention to the potential tragedy of a collision between a passenger train and an 18-ton object.

Increased Loadings Expected in All Districts

The Association of American Railroads, consolidating the reports of all the 13 shippers' advisory boards, calculates that freight car loadings in the present quarter should turn out 10.7 per cent above the actual loadings in the third quarter of 1935. The estimated total number of cars is 5,298,035. The reports by districts show the following totals, in carloads:

Shippers' Boards	Actual Loadings 1935	Estimated 1936	Increase, P.C.
Allegheny	597,631	682,144	14.1
Pacific Coast	170,825	186,276	9.0
Pacific Northwest	180,473	187,251	3.8
Southeast	437,052	481,731	10.2
Southwest	307,783	321,049	4.3
Great Lakes	350,981	400,598	14.1
Atlantic States	505,678	555,384	9.8
Central Western	188,535	202,323	7.3
New England	92,181	94,046	2.0
Northwest	410,368	472,123	15.0
Mid-West	654,803	720,377	10.0
Ohio Valley	565,610	635,412	12.3
Trans - Missouri - Kansas	322,277	359,321	11.5
Total	4,784,197	5,298,035	10.7

Twenty-nine commodities are included in the estimates, and increases are expected in all but three. Following are the more notable increases: Citrus fruits, 13.2 per cent; coal and coke, 10.6 per cent; ores, etc., 29.7 per cent; lumber, etc., 14.2 per cent; iron and steel, 13.4 per cent; machinery and boilers, 16.8 per cent; cement, 14.3 per cent; brick, etc., 18.6 per cent; lime and plaster, 12.7 per cent; automobiles, etc., 14.1 per cent; agricultural implements, etc., 17.7 per cent; jellies, pickles, etc., 12.3 per cent. The estimate on hay, straw and alfalfa is for a decrease of 13.9 per cent.

McReynolds President of Advertising Federation

E. H. McReynolds, manager of the publicity and advertising department of the Missouri Pacific, was elected president of the Advertising Federation of America at its meeting in Boston on July 2. The Federation is the national organization of advertising interests of the country. Mr. McReynolds has been in charge of advertising and public relations on the Missouri Pacific since 1923. He was born in 1888 in Bates County, Mo., and was educated at the University of that state. His early experience was in newspaper writing, including the writing of advertising copy. In 1919 he handled publicity for the A. E. F. in France while serving with the United States marines.

Hearings on Santa Fe Transportation Company Proposal

A series of hearings before the California Railroad Commission on the application of the Santa Fe Transportation Company to inaugurate a one-ticket, bus-and-rail transportation service in California at a flat rate of 1½ cents a mile was begun at San Diego, Cal., on July 7. A two-day hearing scheduled for San Bernardino may be transferred to Los Angeles for July 14 and 15.

Net Deficit for Four Months $30,218,472

Class I railroads for the first four months of 1936 reported to the Interstate Commerce Commission a net deficit after interest and other fixed charges of $30,218,472, as compared with a deficit of $51,526,885 for the corresponding period of last year, according to the commission's monthly compilation of selected income and balance-sheet items. For the month of April the deficit was only $2,295,339, as compared with $8,166,910 in April, 1935. The income available for fixed charges was nearly $20,000,000 greater for the four months period this year while the total fixed charges were nearly $2,000,000 less.

SELECTED INCOME AND BALANCE-SHEET ITEMS OF CLASS I STEAM RAILWAYS

Compiled From 138 Reports (Form IBS) Representing 144 Steam Railways

TOTALS FOR THE UNITED STATES (ALL REGIONS)

For the month of April 1936	For the month of April 1935	*Income Items*	For the four months of 1936	For the four months of 1935
$41,547,642	$34,708,721	1. Net railway operating income	$146,112,622	$121,075,242
11,790,216	13,182,312	2. Other income	45,584,626	50,624,647
53,337,858	47,891,033	3. Total income	191,697,248	171,699,889
1,731,002	1,589,364	4. Miscellaneous deductions from income	6,298,759	5,896,672
51,606,856	46,301,669	5. Income available for fixed charges	185,398,489	165,803,217
		6. Fixed charges:		
11,328,345	11,153,198	6-01. Rent for leased roads	44,477,921	44,113,035
41,352,938	42,095,773	6-02. Interest deductions	166,232,336	168,327,479
218,379	217,075	6-03. Other deductions	874,676	872,560
52,899,662	53,466,046	6-04. Total fixed charges	211,584,933	213,313,074
$ 1,292,806	$ 7,164,377	7. Income after fixed charges	$ 26,186,444	$ 47,509,857
1,002,533	1,002,533	8. Contingent charges	4,032,028	4,017,028
$ 2,295,339	$ 8,166,910	9. Net income*	$ 30,218,472	$ 51,526,885
16,131,882	16,027,348	10. Depreciation (Way and structures, and Equipment)	64,522,814	64,916,725
1,554,806	1,350,289	11. Federal income taxes	6,495,554	5,357,221
		12. Dividend appropriations:		
785,476	3,248,058	12-01. On common stock	16,382,503	23,889,535
882,585	570,696	12-02. On preferred stock	4,909,502	3,866,546

Selected Asset Items	Balance at end of April 1936	Balance at end of April 1935
13. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	$690,225,716	$767,492,638
14. Cash	$445,010,757	$331,390,766
15. Demand loans and deposits	5,267,039	10,554,436
16. Time drafts and deposits	31,974,359	39,354,639
17. Special deposits	97,693,654	84,712,553
18. Loans and bills receivable	2,503,762	4,243,574
19. Traffic and car-service balances receivable	58,197,647	53,927,535
20. Net balance receivable from agents and conductors	46,014,652	44,002,654
21. Miscellaneous accounts receivable	146,688,445	144,019,665
22. Materials and supplies	299,299,522	305,815,687
23. Interest and dividends receivable	25,844,292	37,985,829
24. Rents receivable	2,230,125	2,824,146
25. Other current assets	5,804,458	10,872,573
26. Total current assets (items 14 to 25)	$1,166,528,712	$1,069,704,057
Selected Liability Items		
27. Funded debt maturing within 6 months†	$347,200,625	$187,212,741
28. Loans and bills payable‡	$244,895,620	$326,419,508
29. Traffic and car-service balances payable	74,068,476	68,344,627
30. Audited accounts and wages payable	235,927,257	217,460,803
31. Miscellaneous accounts payable	79,909,692	77,252,646
32. Interest matured unpaid	457,715,667	344,951,334
33. Dividends matured unpaid	2,557,067	4,721,019
34. Funded debt matured unpaid	434,951,725	292,878,196
35. Unmatured dividends declared	1,414,116	1,836,329
36. Unmatured interest accrued	107,690,473	109,447,397
37. Unmatured rents accrued	36,935,524	36,165,792
38. Other current liabilities	22,105,270	24,449,591
39. Total current liabilities (items 28 to 38)	$1,698,170,887	$1,503,927,242
40. Tax liability (Account 771):		
40-01. U. S. Government taxes	$51,984,889	$35,613,086
40-02. Other than U. S. Government taxes	130,228,768	132,827,091

* The net income as reported includes charges of $1,417,324 for April, 1936, and $5,713,086 for the four months of 1936 on account of accruals for excise taxes levied under the Social Security Act of 1935; also $3,969,185 for April, 1936, and $7,986,962 for the four months of 1936 under the requirements of an Act approved August 29, 1935, levying an excise tax upon carriers and an income tax upon their employees, and for other purposes. (Public No. 400, 74th Congress.) The net income for April, 1935, includes credits of $2,050,653 on account of reversal of charges previously made for liability under the Railroad Retirement Act of 1934. The net income for the four months of 1935 includes charges of $4,143,041 on account of accruals for liability under the Railroad Retirement Act of 1934.

† Includes payments which will become due on account of principal of long-term debt (other than that in Account 764, Funded debt matured unpaid) within six months after close of month of report.

‡ Includes obligations which mature not more than 2 years after date of issue.

§ Deficit or other reverse items.

NET INCOME OF LARGE STEAM RAILWAYS WITH ANNUAL OPERATING REVENUES ABOVE $25,000,000

Name of railway	Net income after depreciation, For the four months of 1936	Net income after depreciation, For the four months of 1935	Net income before depreciation, For the four months of 1936	Net income before depreciation, For the four months of 1935
Alton R. R.	* $561,452	* $613,872	* $452,582	* $506,541
Atchison, Topeka & Santa Fe Ry. System§	* 1,647,762	* 2,405,412	2,132,925	1,475,998
Atlantic Coast Line R. R.	1,314,176	804,796	2,028,922	1,558,927
Baltimore & Ohio R. R.	* 2,418,610	* 1,994,747	44,613	320,259
Boston & Maine R. R.	* 2,472,091	* 456,120	* 1,924,198	82,916
Central of Georgia Ry.†	* 859,109	* 952,601	* 602,359	* 687,115
Central R. R. of New Jersey	* 1,041,994	* 590,999	* 529,680	* 37,521
Chesapeake & Ohio Ry.	11,530,357	8,280,240	14,348,536	11,005,182
Chicago & Eastern Illinois Ry.‡	* 372,968	* 454,787	* 173,519	* 249,860
Chicago & North Western Ry.‡	* 6,463,368	* 4,331,102	* 4,795,496	* 2,637,905
Chicago, Burlington & Quincy R. R.	344,516	* 1,623,064	1,876,337	58,767
Chicago Great Western R. R.‡	* 750,092	* 786,890	* 585,435	* 612,034
Chicago, Milwaukee, St. Paul & Pacific R. R.‡	* 5,544,567	* 7,037,668	* 3,749,287	* 5,160,230
Chicago, Rock Island & Pacific Ry.‡	* 6,122,905	* 5,409,846	* 4,675,160	* 3,929,829
Chicago, St. Paul, Minneapolis & Omaha Ry.	* 1,272,029	* 1,009,400	* 1,072,342	* 798,108
Delaware & Hudson R. R.	* 778,324	* 1,177,916	* 406,264	* 849,304
Delaware, Lackawanna & Western R. R.	* 446,528	* 651,022	444,793	249,720
Denver & Rio Grande Western R. R.‡	* 1,530,137	* 1,453,840	* 1,144,508	* 1,056,798
Elgin, Joliet & Eastern Ry.	513,039	612,727	813,646	908,822
Erie R. R. (including Chicago & Erie R. R.)	* 122,770	* 630,977	1,176,781	739,618
Grand Trunk Western R. R.	389,984	* 181,792	788,289	175,734
Great Northern Ry.	* 4,040,902	* 4,252,568	* 2,804,424	* 3,053,058
Illinois Central R. R.	* 1,099,629	* 651,329	1,101,452	1,595,751
Lehigh Valley R. R.	* 423,310	* 540,223	344,599	243,132
Long Island R. R.	* 585,883	* 810,272	* 192,180	* 428,502
Louisville & Nashville R. R.	1,916,559	836,039	3,311,009	2,258,089
Minneapolis, St. Paul & Sault Ste. Marie Ry.	* 2,444,045	* 2,610,506	* 2,034,779	* 2,245,369
Missouri-Kansas-Texas Lines	* 1,031,485	* 1,845,910	* 603,230	* 1,407,693
Missouri Pacific R. R.‡	* 4,404,592	* 6,263,326	* 3,002,632	* 4,814,627
New York Central R. R.¶	* 758,355	* 2,578,831	4,635,825	2,964,869
New York, Chicago & St. Louis R. R.	807,047	102,115	1,323,166	644,868
New York, New Haven & Hartford R. R.‡	* 3,198,965	* 1,449,682	* 2,049,537	* 242,392
Norfolk & Western Ry.	9,707,320	6,267,560	11,203,508	7,768,203
Northern Pacific Ry.	* 3,744,148	* 4,330,106	* 2,701,588	* 3,272,918
Pennsylvania R. R.	5,965,751	6,270,105	13,080,839	13,308,055
Pere Marquette Ry.	890,766	441,753	1,736,450	1,300,896
Pittsburgh & Lake Erie R. R.	987,231	811,841	1,588,624	1,381,300
Reading Co.	1,806,707	1,425,510	2,872,885	2,426,955
St. Louis-San Francisco Ry.‡	* 3,074,430	* 4,305,880	* 1,997,002	* 3,249,309
St. Louis Southwestern Lines‡	* 147,684	* 74,924	54,858	134,397
Seaboard Air Line Ry.†	* 2,044,717	* 1,703,269	* 1,418,338	* 1,089,242
Southern Ry.	* 188,129	* 1,493,360	894,493	* 554,860
Southern Pacific Transportation System‖	* 1,914,494	* 3,570,811	715,158	* 1,056,942
Texas & Pacific Ry.	292,494	43,387	680,980	444,810
Union Pacific R. R.	1,218,614	2,376,126	3,333,895	4,536,155
Wabash Ry.†	* 757,466	* 901,670	* 44,314	* 179,469
Yazoo & Mississippi Valley R. R.	* 387,157	* 1,035,127	* 217,075	* 866,800

† Report of receiver or receivers.
‡ Report of trustee or trustees.
§ Includes Atchison, Topeka & Santa Fe Ry., Gulf, Colorado & Santa Fe Ry., and Panhandle & Santa Fe Ry.
¶ Includes Boston & Albany, lessor to New York Central R. R.
‖ Includes Southern Pacific Company and Texas & New Orleans R. R. The operation of all separately operated solely controlled affiliated companies resulted in a net deficit of $1,341,404 for four months of 1936 and $1,382,284 for four months of 1935. These figures are not reflected in this statement.
* Deficit.

For the four months period 55 roads reported a net income of $46,743,531, while 80 reported a net deficit. For the corresponding four months of last year only 42 roads had a net income while 93 had deficits. The commission's compilations are shown in the accompanying tables.

Long Island Loses Appeal on New York City Fares

The New York Court of Appeals on July 8 affirmed the injunction recently granted by the New York Supreme Court, Kings County, to restrain the Long Island from charging more than two cents a mile to passengers traveling within the limits of New York City. The injunction, granted on petition of the New York Transit Commission, which has regulatory jurisdiction in New York City, is based on Section 57a of the New York railroad law, which prohibits a railroad operating within New York City, and owned by another carrier, from charging a higher rate for passenger service within that city than the parent railroad charges outside. The Pennsylvania's two-cents-per-mile coach rate brings the Long Island within the provisions of this law.

The Long Island's contention that this law is unconstitutional is now rejected by New York State's highest court. Pending its appeal the road has been charging three cents a mile in New York City and issuing coupons under the terms of a conditional stay as outlined in the *Railway Age* of June 27, page 1070.

Meanwhile the New York Public Service Commission has ordered the two-cent rate in effect for intrastate travel outside New York City, but the Long Island has appealed this decision to the New York Supreme Court, Albany County.

U. P. Creates Department of Research

The Union Pacific has established a bureau of research, with O. Jabelmann, assistant general superintendent of motive power and machinery, with headquarters at Omaha, Neb., as its head. Men now engaged in research work have been assigned to the new bureau, and mechanical, electrical and metallurgical experts will be added. The bureau will study, survey and perfect improvements in design and construction of cars and locomotives.

Zones Proposed for Exemptions Under Motor Carrier Act

The Interstate Commerce Commission on July 8 made public a series of proposed reports by examiners of its Bureau of Motor Carriers recommending findings to be made by the commission defining the areas of several municipalities and those contiguous thereto, and of the zones adjacent to and commercially a part of such municipalities, within the meaning of Section 203 of the motor carrier act, 1935. Section 203 provides for the exemption to a large extent from the regulation by the commission otherwise provided for in the act, of transportation by motor vehicles wholly within a municipality or between contiguous municipalities or within a zone adjacent to and commercially a part of any such municipalities, except when the transportation is under a common control, management, or arrangement for a continuous carriage or shipment to or from a point without such municipality, municipalities, or zone. At the hearings, in general the railroads and the over-the-road motor carriers contended for definitions limiting the commercial zones, in some cases to the corporate or switching limits, while the local truckers and shippers in general contended for greatly enlarged zones. Proposed findings have been made by examiners in the case of New York, Chicago, St. Louis, and Los Angeles, recommending boundaries somewhat within the extremes contended for.

C. G. W. Competition Will Be Met

Freight rate reductions on merchandise moving between Chicago and the Twin Cities are being planned by a group of northwestern railroads to meet the flat-car truck-trailer competition of the Chicago Great Western. The railroads involved are the Chicago & North Western, the Chicago, Burlington & Quincy, the Chicago, Milwaukee, St. Paul & Pacific, the Minneapolis, St. Paul & Sault Ste. Marie, the Chicago, St. Paul, Minneapolis & Omaha, the Illinois Central and the Minneapolis & St. Louis. These carriers intend to establish an all-commodities rate of 35 cents per 100 lb. subject to a minimum weight of 35,000 lb., and certain commodity exemptions. These and lower rates would compare with the present rail rates of about 55 cents, applying to a 40,000 lb. minimum, and the present motor truck rate of 41 cents per 100 lb., at which rate a minimum weight of 20,000 lb. is accepted. Tariffs for the new rates are in process of preparation by the western trunk line committee and are expected to be filed within ten days, to become effective by August 15.

The action taken by these lines follows the move made by the Chicago Great Western when it entered into an agreement with Keeshin Motor Express Company, Inc., and the Illinois-Minnesota Motor Carriers Conference to handle motor trucks or trailers loaded with merchandise on flat cars at rates of $42.50 (and of $21.25 for empty vehicles) between Chicago and the Twin Cities. The rate charged shippers by Keeshin is 46 cents per 100 lb., northbound, and 41 cents southbound.

This service was started by the C. G. W. on July 7 with an initial shipment of 42 trailer loads of freight. The largest offering of truck trailers was from the Illinois-Minnesota group, which includes more than 28 individual companies. This group alone had about 34 trailers consigned to the Twin Cities from Chicago, while on the

reverse movement approximately 28 trailers were offered. The Keeshin company had 8 loaded trailers scheduled to make the initial run from Chicago, and about 6 for the movement to Chicago.

Tariffs for this service were originally filed on February 6, to become effective March 10, but were suspended by the Interstate Commerce Commission on March 9, due to opposition from railroads and certain shipping interests. After hearing all arguments, the commission, on June 26, by a vote of 8 to 3, vacated the suspension and set July 7 as the effective date of the tariff.

Immediately following approval of the tariff, the C. G. W. ordered a portion of its flat cars equipped with the necessary accessories to hold the highway vehicles on the cars and built ramps for loading the trailers. About 50 flat cars are now available for the service.

The "Abraham Lincoln" One-Year Old

The Alton Railroad, on July 1, celebrated the first birthday of its "Abraham Lincoln," streamlined train operating between Chicago and St. Louis. Ceremonies were held in the Union Station at St. Louis as the train started for Chicago, again in the Union Station at Chicago, and also on the return trip.

Messrs. Voorhees and Brown Cut Birthday Cake

Birthday cake and souvenir rings, bearing the likeness of the great emancipator, were distributed to passengers on the train by young ladies dressed in the costumes of Lincoln's day. The cake was cut (in Chicago) by H. B. Voorhees, vice-president, and W. G. Brown, passenger traffic manager, at the ceremonies in the observation car.

Travel in West Better Than Last Year

Passenger travel in the west so far this year has exceeded that of the same period in 1935 and promises well for the remainder of the year; not only regular traffic, but holiday and convention movements.

On the Chicago & North Western, for example, there was a 20 per cent increase in passengers in and out of the Chicago passenger station during June, excluding suburban business, as compared with June last year. The "400," fast train, showed an increase of 2,437 passengers in that month over the same month of 1935, or a 47 per cent increase. The "Minnesota 400" operating between Wyeville, Wis., and Mankato, Minn., via Rochester since June 14 as a connection with the "400," is also carrying very satisfactory loads.

Suburban passengers in and out of the Chicago station in June increased 89,000 over a year ago, while passenger receipts at Chicago alone showed a $64,000 increase. Streamliners to Denver and the Pacific Coast are carrying capacity loads, while regular trains to California and the Pacific Coast have extra cars frequently. The "Challenger" led all North Western-Union Pacific California trains in May and is expected to repeat the performance in June.

The best Fourth of July travel in several years was experienced by the western lines this year.

The Hiawatha, of the Chicago, Milwaukee, St. Paul & Pacific, on July 3, 4 and 5, was operated in 16 sections carrying 6,000 revenue passengers. These 16 sections include the regular north and south bound Hiawathas, two regular sections which operate between Chicago and the North Woods daily, and two extra Chicago-Twin Cities sections on July 3 and 4. During the first four days in July the Milwaukee experienced increases in revenue, varying from 40 per cent to more than 100 per cent as compared with the same period in 1935 on traffic from Milwaukee, Aberdeen, Winona and La Crosse.

The Chicago, Burlington & Quincy reported that travel was the heaviest in years. The Twin Zephyrs to the Twin Cities had extra sections while the Advance Zephyrs to Denver were loaded to capacity.

The New York Central carried 50 per cent more passengers in and out of Chicago than a year ago.

The Chicago & North Western carried 2,500 passengers to Lake Geneva in the three days. All trains to Wisconsin resorts had extra sections. The "Flambeau" to the North Woods of Wisconsin was operated in two sections on the Fourth, with more than 500 persons on board.

The Illinois Central Louisiane left Chicago on July 3 for New Orleans, in three sections, and the Green Diamond also had extra sections.

A Baltimore & Ohio train from Chicago to New York on July 4 had a 231 per cent increase in revenue as compared with last year. The Alton Limited was run out of Chicago in three sections on July 3 and the Abraham Lincoln had extra sections.

The Shriners' convention at Seattle on July 14 to 16 promises to be the largest in several years. On July 2 the Chicago & North Western took 2,000 persons in 10 special trains and a number of smaller parties. It also ran three trains on July 7 for the Medinah Temple of Chicago.

The movement over the Milwaukee likewise started on July 3. A Madison (Wis.) special was operated on July 7, a Davenport (Iowa) special on July 8, an extra section of train No. 5 on July 8, and a Washington (D. C.) special on July 10.

Low Fares in East Bring Revenue Gains for June

(Continued from page 82)

revenues as compared with May, 1935. Thus it attributes the June gain to the general improvement in business as well as to the lower fares. Pullman business on the Lackawanna is also increasing; it was better in June than in May. This road also reported a heavy volume of travel over the July 4 holiday. On Sunday night, July 5, for example, four sections of its "Lackawanna Limited" and two sections of its "Mountain Special" carried 2,277 passengers as compared with the 1,335 who patronized these trains on the same day last year.

The Central of New Jersey estimates that, with commutation and special excursion revenues eliminated, it had for June increases respectively of 12.8 per cent and 8.5 per cent in revenues from local and inter-line passengers as compared with June, 1935. Also, its Pullman business is on the upgrade and its July 4 holiday volume was substantially greater than 1935.

The Lehigh Valley and the Pennsylvania have as yet compiled no figures or estimates on the results of the fare reductions but both reported a heavy volume of passenger business for the holiday. The Pennsylvania, for example, operated in and out of New York approximately 100 extra trains over the week-end. Included in these were 1,300 extra coaches and more than 400 extra Pullman cars.

Meanwhile reports are current that bus lines, feeling the effect of the competition offered by the reduced railway fares, are planning further reductions in their own rates. The new set-up leaves the spread between bus and coach fares much less than was formerly the case and on runs where this differential is not large the traffic is turning to the rails. This is especially true on such routes as those out of New York to Philadelphia, Pa., Boston, Mass., Albany, N. Y., Washington, D. C., and others where rail service is almost twice as fast as that of buses.

Equipment and Supplies

LOCOMOTIVES

THE MONESSEN SOUTHWESTERN is inquiring for one 0-6-0 switching locomotive.

FREIGHT CARS

THE KENNECOTT COPPER CORP. is inquiring for 50 ore cars of 100 tons' capacity.

THE CAMBRIA & INDIANA has ordered 300 hopper cars of 50 tons' capacity from the American Car & Foundry Company.

THE ST. LOUIS SOUTHWESTERN has ordered 50 automobile cars from the General American Transportation Company.

THE CENTRAL OF GEORGIA has ordered 200 hopper cars, subject to approval by the court, from the Pullman-Standard Car Manufacturing Company.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 500 box cars from the Pullman-Standard Car Manufacturing Company.

THE WISCONSIN CENTRAL, subject to approval of the court, has ordered 250 box cars from the Pullman-Standard Car Manufacturing Company.

THE WESTERN MARYLAND has bought from car companies certain parts and is using other materials with them to assemble 25 caboose cars in its own shops. Inquiry for this equipment was reported in the *Railway Age* of February 8.

THE AMERICAN REFRIGERATOR TRANSIT COMPANY has ordered 1021 steel underframe refrigerator cars of 40 tons' capacity—511 from the American Car & Foundry Company and 510 from the General American Transportation Corporation. Inquiry for this equipment was reported in the *Railway Age* of May 16.

PASSENGER CARS

THE TEMISKAMING & NORTHERN ONTARIO has ordered five first-class coaches, which are to be air conditioned, also four combination baggage-coach cars, which are not to be air conditioned, from the National Steel Car Corporation, Ltd. Inquiry for five coaches was reported in the *Railway Age* of May 16.

IRON & STEEL

THE DENVER & RIO GRANDE WESTERN is expected to enter the market for rails, having applied to the Interstate Commerce Commission for authority to borrow $1,500,000. Of a total of 25,409 tons, 11,809 tons are described as immediate, while 13,600 tons are described as requirements for 1937.

THE NORFOLK & WESTERN has placed orders for 20,000 tons of 131-lb. steel rail divided as follows: Carnegie-Illinois Steel Corp. 15,000 tons and Bethlehem Steel Company 5,000 tons.

NEW YORK CENTRAL.—A contract has been given to the Bethlehem Steel Company for 5,000 tons of steel to be used on the West Side Improvements of this road between West 82nd Street and West 94th Street, New York City. The Poirier & McLane Corporation, New York, are the contractors on this section.

MISCELLANEOUS

CHICAGO, BURLINGTON & QUINCY.—Fafnir Bearings, Inc., New Britain, Conn., are furnishing bearings for a Diesel-electric locomotive being constructed by the Cummins Engine Company, Columbus, Ind.

Construction

BOSTON & MAINE.—A contract has been given to the Bethlehem Steel Company, Boston, Mass., for rebuilding bridge 0.14 (old 401) at Manchester, N. H., to cost about $83,000. A contract has also been given by this road to the Phoenix Bridge Company, New York, for rebuilding bridge 123.27 (old 1) at While River Junction, Vt., to cost about $59,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company's roundhouse at St. Joseph, Ill., was damaged by fire on July 5 to an estimated extent of $200,000, including damage to three locomotives and the machine shops.

ERIE.—This road has been directed by the New York Public Service Commission to award the necessary contract and begin work as soon as practicable on the elimination of its Pike street crossing in Port Jervis, N. Y. C. B. Moon, Inc., Cleveland, Ohio, was the lowest bidder for this work at $197,283.

NEW YORK CENTRAL.—A contract has been given to James Stewart & Company, Inc., New York, for the construction of a portion of City Structure No. 5, the covering over the tracks of this road on its West Side Improvements between West 111th and West 121st Street, New York City.

A contract has been let to the Poirier & McLane Corporation, New York, for the construction of the substructure, superstructure and other work of City Structure No. 5, the covering over the tracks on the West Side Improvements between West 82nd Street and West 94th Street, New York City.

ST. LOUIS, MO.—This city, through the Board of Public Service, will receive bids until noon, July 24, for the reconstruction of the reinforced concrete and structural steel viaduct that carries Kingshighway boulevard across the tracks of the Wabash adjacent to Forest Park in the central western section of the city.

Supply Trade

The **Conner Manufacturing Company,** Louisville, Ky., has been appointed distributor for northwestern Kentucky for the **Republic Steel Corporation.**

Charles Millar & Son Company, Utica, N. Y., and the **Taylor-Parker Company, Inc.,** Norfolk, Va., have been appointed distributors for the **Republic Steel Corporation.**

The **Consolidated Guide Corporation,** 153 N. Michigan avenue, Chicago, has been organized to publish a co-ordinated rail, express, motor truck, parcel post and air rate guide. Officers of the company are: **Raymond T. Fischer,** president; **J. E. Sanford,** vice-president; **H. W. Smith, Jr.,** treasurer; **John N. Vogelsang,** general sales manager, and **Hugo Heyns,** editor in chief.

Effective September 1, **B. F. Affleck,** president of the **Universal Atlas Cement Company,** Chicago, subsidiary of the United States Steel Corporation, will retire under the Steel Corporation pension plan to devote his time to his private interests. He will be succeeded by **B. S. Smith,** who has resigned as president of the Pennsylvania Dixie Cement Corporation, New York.

E. I. Hetsch, formerly assistant to chief mechanical engineer of the Nathan Manufacturing Company, has been appointed sales engineer of the **Q & C Company,** with headquarters at 90 West street, New York. Mr. Hetsch was educated at John Hopkins University and graduated from the Institute of Machine Design at Karlsruhe, Germany. He entered railroad service in 1920 with the Chesapeake & Ohio and after serving in various capacities was assigned to special work in a study of locomotive lubrication.

OBITUARY

Clayton Mark, president of Clayton Mark and Company, Chicago, and a director of the National Malleable and Steel Castings Company, and the Interlake Iron Company, died in Lake Forest, Ill., on July 7 after a month's illness. He was born in Fredericksburg, Pa., in June, 1858, and in 1876 entered the employ of the Chicago Malleable Iron Company as a clerk. When this company was succeeded by the National Malleable and Steel Castings Company he continued in its employ, being a director until 1894, a second vice-president until 1902, and a resident vice-president until 1917. In 1902 he organized the Mark Manufacturing Company, of which he was president until 1919, when the company was merged into the Steel and Tube Company of America, of which he became chairman of the board. He retained the latter position until this company was sold to the Youngstown Sheet and Tube Company in 1923, at which time he organized Clayton Mark and Company, of which he was president at the time of his death.

Financial

DENVER & RIO GRANDE WESTERN.—*Trustees' Certificates.*—The trustees have applied to the Interstate Commerce Commission for authority for an issue of $1,650,000 of trustees' certificates of indebtedness, to be used in paying for 11,809 tons of rail and fastenings, taxes, and the purchase of 13,600 tons of new rail.

DENVER & RIO GRANDE WESTERN.—*R.F.C. Report.*—A program of betterments to this property amounting to $15,000,000 to $20,000,000 is suggested in a report by W. W. Sullivan, examiner of the railroad division of the Reconstruction Finance Corporation, on an examination of the property made at the request of J. Foster Symes, judge of the federal court at Denver, Colo., and made public by the R.F.C. without recommendation. The report recommends replacement of 90-pound rail in main line track between Denver and Salt Lake with 112-pound rail and fixtures, to eliminate burdensome maintenance costs and delays, additional ballast, renewal or strengthening of timber and combination bridges, grade eliminations and curve reductions in many places, and additional freight cars to replace obsolete equipment which is being retired and to provide for such increased traffic as may accrue. Studies as to these various requirements are being made. It is stated that the trustees look forward to an increase in freight traffic and that it is anticipated that, when the rehabilitation and improvement program now started and in contemplation is completed, the railroad will be able to establish schedules on its own lines and to influence the maintenance of schedules on connecting railroads that will greatly strengthen its position in the through traffic field. Approximately $3,200,000 will be expended this year for betterments but a complete program has not been determined upon. The Denver & Salt Lake, the report says, should be placed in physical condition comparable with the Rio Grande. To accomplish this the Salt Lake property should have heavier rail, improved roadway, strengthened bridges and signaling devices to facilitate train movement. Improvement of the Moffat tunnel to remove operating handicaps due to ventilating limitations is suggested as a problem for study. Three alternatives are mentioned: additional ventilating equipment, electrification, or the use of large Diesel-engined units.

FORT WORTH & RIO GRANDE.—*Sale Recommended.*—John T. Harding, special master, on July 7 recommended that the federal district court at St. Louis approve the proposed sale of the Fort Worth & Rio Grande by the St. Louis-San Francisco to the Atchison, Topeka & Santa Fe. Officers of both roads have agreed on a sale price of $1,519,325 for the 233 mile line, which extends from Fort Worth, Tex., to Menard.

LOUISVILLE & NASHVILLE.—*Bonds.*—This company has been authorized by the Interstate Commerce Commission to procure the authentication and delivery of $30,000,000 of its first and refunding mortgage 3¾ per cent bonds, Series E, to be exchanged for a like amount of 4½ per cent bonds now in its treasury; and to sell $26,000,000 of the new bonds at 96 per cent of par and accrued interest. Morgan, Stanley & Company, subject to I.C.C. approval, have offered this $26,000,000 issue, maturing 2003, priced at 98. The proceeds will be used, together with treasury funds, to redeem $3,500,000 St. Louis division first mortgage 6's due 1971 at 107; $10,000,000 of secured 5's due 1941 at 103; and $12,753,000 of first and refunding 5½'s due 2003 at 102.

MINNEAPOLIS & ST. LOUIS.—*Dismemberment Hearing.*—Hearings on the general plan of Associated Railways, Inc., to take over the Minneapolis & St. Louis, being held at Fort Dodge, Iowa, before the Interstate Commerce Commission, were recessed on July 1, and will be resumed at Minneapolis, Minn., on July 27. This procedure was taken to enable the commission to hear testimony on specific abandonments proposed by Associated. The Iowa hearing for the taking of testimony on abandonments ended on July 6 and was resumed on July 10 at Albert Lea.

On July 6 Jesse H. Jones, chairman of the Reconstruction Finance Corporation, announced in Washington that the corporation contemplated the employment of an independent engineer to study the physical condition of the M. & St. L. During the hearing on the general plan at Fort Dodge the Peoria Chamber of Commerce urged the commission to dismiss the petition for dismemberment in the event it is shown the line can be operated successfully as a unit. In making this request, Peter J. Naughton, traffic expert of the chamber, emphasized the importance of the Peoria gateway, now served by 78 trains daily, where, he said, the switching charge is $3 a car, compared with more than $10 at Chicago. He also called attention to a previous rail consolidation which materially reduced the volume of tonnage previously handled by the carriers affected to Peoria. He said that the M. & St. L. was the only Peoria road that operated merchandise cars to Minneapolis and Kansas City, the latter by way of the Santa Fe. Others testifying in opposition to the general plan were R. H. Stewart, of the Barnsdall Oil & Refining Company, Tulsa, Okla., who said his organization would be forced to abandon a large bulk station in Fort Dodge, Iowa, if it lost its M. & St. L. trackage and would adopt trucking over a large territory in north central Iowa; A. B. Combs, secretary of the Marshalltown Chamber of Commerce; B. J. Drummond, manager of the traffic department of the Mason City Chamber of Commerce; O. B. Critz, owner of large grain elevators at Curlew, Iowa, and Arnold; and L. M. O'Leary, of the Fort Dodge Chamber of Commerce.

The first testimony to be taken on abandonments was that pertaining to the 24 miles of track between Gowrie, Iowa, and Clare. S. I. Porter, assistant general auditor of the Burlington, testified that the segment had failed to produce a profit since 1913. He said only one station on the segment would be without rail service and that it did not produce sufficient revenue to warrant retention of such service. A total of 15 witnesses testified in opposition to the abandonment of this section of line, contending that the cutting off of this segment would be a serious handicap to shippers and receivers of freight in the affected towns.

The first testimony on the abandonment of that portion of the line between Fort Dodge, Iowa, and Albert Lea was heard at Fort Dodge on July 3 and 6, with day and night sessions, and was concluded at Albert Lea during hearings which began on July 7.

NEW YORK, CHICAGO & ST. LOUIS.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized this company to issue $1,410,000 of 3 per cent equipment trust certificates, maturing 1937-51, to be sold at not less than 100.659 and accrued dividends. Estabrook & Co. and two associated companies, having purchased the certificates at that price under competitive bidding, are offering them at prices to yield from 0.75 per cent to 3.25 per cent.

ST. LOUIS-SAN FRANCISCO.—*Reorganization Plan.*—A further period of six months, or to December 31, has been allowed the St. Louis-San Francisco within which to file a plan of reorganization, under an order entered by Federal Judge George H. Moore.

SANTA FE TRANSPORTATION COMPANY.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire the property of the Oceanside Truck & Transfer Company and of the Kent Truck & Rigging Company.

WHEELING & LAKE ERIE.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $1,400,000 of 2¼ per cent equipment trust certificates.

WHEELING & LAKE ERIE.—*Readjustment of Capital Structure.*—This company has been authorized by the Interstate Commerce Commission to make effective the plan for a readjustment of its capital structure, proposed by Chairman Jones of the Reconstruction Finance Corporation, as outlined in the *Railway Age* of May 30, page 899.

YREKA WESTERN.—*Receivers' Certificates.*—The receiver for this road has been authorized by the Interstate Commerce Commission to issue $25,000 of receiver's certificates to be delivered to the Southern Pacific for materials and advances of funds to be used in rehabilitating the line of the applicant.

Average Prices of Stocks and of Bonds

	July 7	Last week	Last year
Average price of 20 representative railway stocks..	48.81	48.58	34.14
Average price of 20 representative railway bonds..	79.29	79.33	75.11

Dividends Declared

Louisiana & Missouri River.—Guaranteed Preferred, $3.50, semi-annually, payable August 1 to holders of record July 17.

Piedmont & Northern.—75c, quarterly, payable July 10 to holders of record June 30.

Pittsburgh, Cincinnati, Chicago & St. Louis.—$2.50, payable July 20 to holders of record July 10.

West Jersey & Seashore.—6 Per Cent Special Guaranteed, $1.50, semi-annually, payable January 1 to holders of record December 15.

Railway Officers

EXECUTIVE

The Atchison, Topeka & Santa Fe has organized a department of public relations with **M. L. Lyles,** assistant to the president, in charge.

H. C. Murphy, assistant to the executive vice-president of the Chicago, Burlington & Quincy, has also been elected president of the Burlington Transportation Company to succeed Ralph M. Budd, who resigned as head of the bus company because of the press of other business.

W. H. Guild, general superintendent of the Union Pacific, with headquarters at Kansas City, Mo., has been promoted to executive assistant, with headquarters in Denver, Colo. **C. P. Cahill,** superintendent at Denver, Colo., has been transferred to Kansas City, to take over the duties of Mr. Guild, and in turn has been succeeded by **J. M. Guild,** assistant superintendent of the Colorado division, with headquarters at Denver. W. H. Guild was born at Omaha, Neb., on October 25, 1883, and after serving from 1903 to 1912 as a clerk and stenographer on the Union Pacific at that point, became chief clerk in the office of the general superintendent. Two years later he was appointed chief clerk to the general manager, and in 1916 was advanced to assistant to the general manager. In 1920 he was promoted to assistant to the vice-president in charge of operations, with headquarters at Omaha, Neb., and in 1928 was appointed general superintendent of the Southern district.

Walter L. Price, secretary to the comptroller of the Baltimore & Ohio, has been appointed assistant to vice-president and comptroller. Mr. Price was born on April 10, 1895, at Shrewsbury, York County, Pa., and entered the service of the Baltimore & Ohio on December 26, 1912, in the office of the auditor of freight traffic. He held clerical and secretarial positions successively in the offices of the

Walter L. Price

auditors of coal and coke receipts, freight traffic, passenger traffic and of the general auditor. In November, 1917, Mr. Price was furloughed for military duty and returned to the Baltimore & Ohio in July, 1919, as secretary to federal auditor. When the railroads were returned to private operation he was made secretary to comptroller in March, 1920.

TRAFFIC

J. G. McNab, foreign freight agent of the Canadian Pacific, with headquarters at Vancouver, B. C., has been promoted to general foreign freight agent, with headquarters at Montreal, Que., to succeed **J. J. Morton,** who has resigned to engage in other work.

W. P. O'Rourke, traveling freight agent on the Chicago, Burlington & Quincy at Chicago, has been appointed general agent, with headquarters at Indianapolis, Ind., to succeed **O. G. Hagemann,** who has been transferred to Seattle, Wash., where he replaces **G. B. Smith,** whose appointment as western traffic manager at San Francisco, Cal., was noted in the *Railway Age* for June 20.

FINANCIAL, LEGAL AND ACCOUNTING

F. M. Rivinus, whose appointment as general counsel of the Norfolk & Western, with headquarters at Roanoke, Va., was noted in the *Railway Age* of June 20,

F. M. Rivinus

was born at Germantown, Pa., on October 6, 1882. He was educated at the Delancey School in Philadelphia, Pa., and was graduated from Harvard College in 1904. He entered the service of the Norfolk & Western as assistant solicitor on April 1, 1910, and was appointed assistant general solicitor on January 1, 1917. Mr. Rivinus was promoted to general solicitor at Philadelphia on June 16, 1919, and in May, 1931, his headquarters were moved to Roanoke.

Samuel W. Moore, general counsel of the Kansas City Southern, with headquarters at New York, who has retired with the title of retired general counsel, as noted in the *Railway Age* of June 27, was born on January 24, 1862, in Geauga county, Ohio. Mr. Moore attended Adelbert college, Cleveland, Ohio, and later graduated from the law school of Kansas University, Lawrence, Kan. He first entered railway service in 1890, when he became assistant attorney in Kansas and Missouri for the Atchison, Topeka & Santa Fe. At that time he was connected with the law firm of Lathrop & Smith, which later became Lathrop, Morrow, Fox & Moore. In 1899 he became associated with the Kansas City

Samuel W. Moore

Southern as an attorney, subsequently being appointed general solicitor. In 1920 he became general counsel of the railway, with offices in New York, which position he held until his retirement. While located in New York, Mr. Moore also engaged in the general practice of law as a member of the firm of Moore & Bell.

Frank H. Moore, general solicitor of the Kansas City Southern, whose appointment as general counsel with headquarters as before at Kansas City, Mo., was noted in the *Railway Age* of June 27, has been connected with this company for 26 years. He was born on September 1, 1872, at Mantua, Ohio, and received his higher education at the University of Kansas, and Columbian university (now George Washington university), Washington, D. C., being graduated from the latter university with the degree of LL.B. in 1896. From the latter year until 1900, Mr. Moore engaged in the general practice of law at Kansas City, Mo., then going to Albuquerque, N. M., where he practiced law

Frank H. Moore

for 10 years. In 1910 he entered railway service as an assistant attorney for the Kansas City Southern, and two years later he was made assistant general solicitor.

In 1920 he was advanced to general solicitor, which position he held until his recent appointment as general counsel.

Douglas H. Worrall, whose appointment as tax agent of the Pennsylvania,

Douglas H. Worrall

with headquarters at Philadelphia, Pa., was noted in the *Railway Age* of June 20, was graduated from Harvard University in 1920 and the University of Pennsylvania Law School in 1923. He entered the real estate department of the Pennsylvania 11 years ago and has been assistant tax agent in that department since September, 1926.

OPERATING

H. H. Clark, assistant division engineer on the Eastern district of the Erie, with headquarters at Buffalo, N. Y., has been promoted to inspector of transportation, with headquarters at Cleveland, Ohio.

C. L. Ruppert, superintendent of the Illinois division of the Chicago, Rock Island & Pacific, with headquarters at Rock Island, Ill., has retired and has been succeeded by **W. H. Kelly,** formerly superintendent of the St. Louis terminals of the Chicago, Burlington & Quincy.

John Stevenson, accountant of parlor, sleeping and dining cars of the Canadian Pacific, has retired under the company's pension regulations after 43 years of service with this road. **H. B. Timmins,** assistant accountant, has been appointed accountant of parlor, sleeping and dining cars, succeeding Mr. Stevenson.

F. E. Spery, acting superintendent of the St. Louis terminals of the Chicago, Burlington & Quincy, with headquarters at St. Louis, Mo., has been promoted to assistant to the general manager, lines east of the Missouri River, with headquarters at Chicago, to succeed **E. H. Piper,** who has been transferred to the same position on the lines west of the Missouri River. **W. P. Wilson** has been appointed superintendent of the St. Louis terminals, with headquarters at St. Louis, Mo., to succeed **W. H. Kelly,** who has resigned to become superintendent of the Illinois division of the Chicago, Rock Island & Pacific, with headquarters at Rock Island, Ill. **H. E. Hinshaw,** assistant superintendent of the Burlington, with headquarters at Wymore, Neb., has been transferred to the La Crosse division, with headquarters at North La Crosse, Wis., to succeed **W. H. Hillis,** who has resigned to become engineer maintenance of way of the Chicago, Rock Island & Pacific at Chicago, and has been succeeded by **W. O. Frame,** maintenance engineer of the Central district, with headquarters at Burlington, Iowa.

W. K. Weaver, executive assistant to the president of the Railway Express Agency, with headquarters at New York, has been appointed general manager of the Eastern Lakes department, with headquarters at Cleveland, Ohio, succeeding the late **George T. Carlin. R. P. Woodman,** chief clerk to general manager, has been appointed superintendent of the Massachusetts and Northern New England division, with headquarters at Boston, Mass., succeeding **H. C. Trombly,** who has been appointed superintendent of the Boston division, at Boston.

The following changes and appointments in the operating department of the Baltimore & Ohio, affecting its Eastern lines, are effective July 15: The Maryland district will be extended to include the Monongah division. It will then be composed of the Baltimore, Baltimore terminal, Cumberland and Monongah division, with **F. G. Hoskins** continuing as general superintendent. The Pennsylvania district will also be extended to embrace the Wheeling division, which heretofore comprised only the Pittsburgh and Buffalo divisions. **J. M. Scott,** general superintendent at Wheeling, W. Va., will be transferred to Pittsburgh in charge of the enlarged Pennsylvania district, succeeding **E. A. Peck,** who has been general superintendent at Pittsburgh. Mr. Peck is retiring after 40 years of service. The position of general superintendent at Wheeling will be abolished. **Charles M. Shriver,** superintendent of the Baltimore division at Baltimore, has been appointed superintendent of the Cumberland division at Cumberland, succeeding **H. R. Laughlin,** who will become a member of the staff of the general manager of Eastern lines, at Baltimore. **H. F. Wyatt,** assistant superintendent of the Baltimore division, has been promoted to superintendent of the Baltimore division, succeeding Mr. Shriver. **John Edwards, Jr.,** division engineer of the Monongah division at Grafton, W. Va., has been appointed assistant superintendent of the Baltimore division, at Baltimore, succeeding Mr. Wyatt. **H. L. Exley,** on the staff of the engineer maintenance of way at Baltimore, has been appointed division engineer at Grafton, succeeding Mr. Edwards.

J. J. Mahoney, who has been promoted to superintendent of transportation of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, entered railway service in 1906 with the Denver & Rio Grande Western at Pueblo, Colo. He entered the employ of the Atchison, Topeka & Santa Fe as a switchman at that point on May 28, 1912, and on July 1, 1920, was promoted to switching inspector at La Junta, Cal. On November 15 of that year he was promoted to general transportation inspector, which position he held until December 1, 1924, when he was promoted to assistant trainmaster. On June 1, 1925, he was promoted to assistant to the general superintendent of transportation, which

J. J. Mahoney

position he has held until his promotion to general superintendent of transportation on July 1, 1936.

Stanley M. Houston, who has been appointed assistant general manager of the Southern Pacific of Mexico, with headquarters at Guadalajara, was born on June 5, 1898, at Albuquerque, N. M., and entered railway service on March 30, 1913,

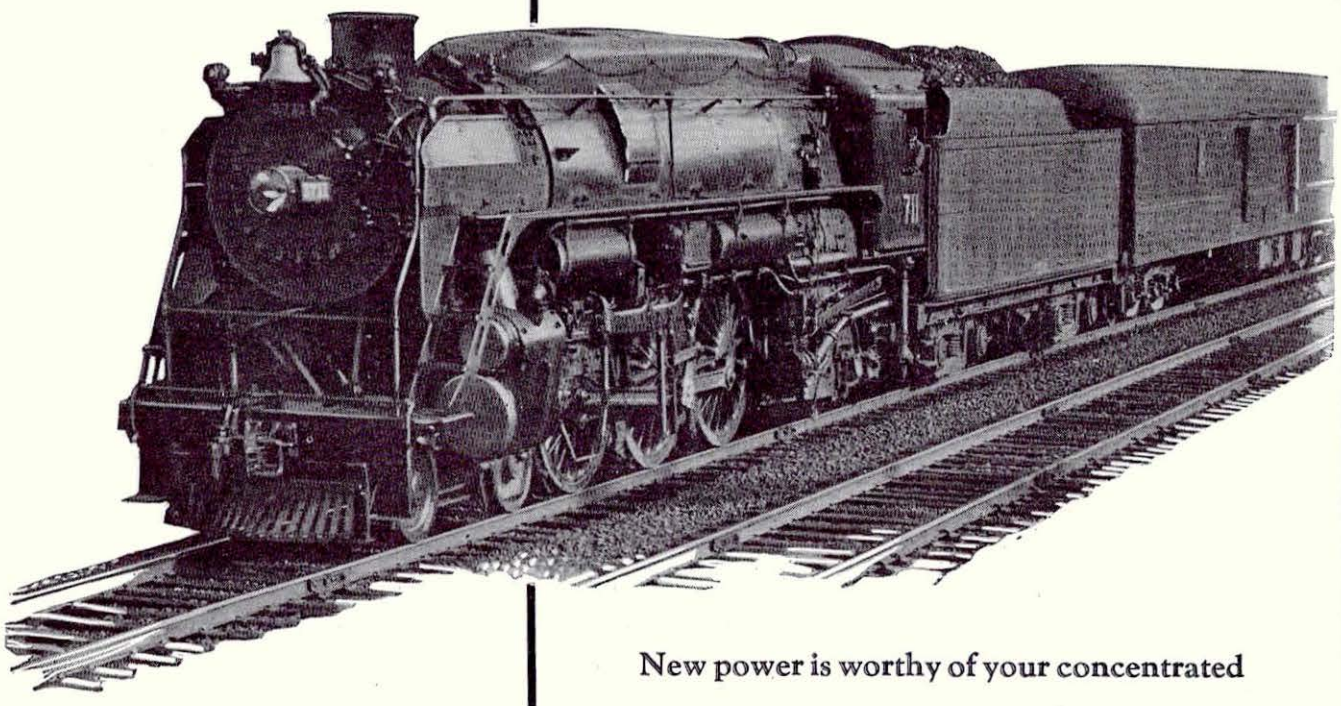
Stanley M. Houston

as a machinist apprentice, with the Arizona Eastern, at Globe, Ariz. On April 1, 1917, he was promoted to a machinist, and on March 1, 1919, to roundhouse foreman. From March, 1922, to March, 1923, he was general foreman, and from the latter date to October, 1924, master mechanic. In October, 1924, he resigned to become superintendent of shops of the Southern Pacific of Mexico, which position he held until July, 1927, when he was promoted to superintendent of motive power.

William R. Eble, who has been appointed superintendent of the Chicago, Burlington & Quincy, with headquarters at Galesburg, Ill., was born in that city on July 3, 1892, and entered railway service on June 21, 1909, as a car checker in the yard department of that road at Galesburg. After serving as a stenographer and clerk at the Galesburg freighthouse from September, 1909, to January 17, 1910, and stenographer and clerk in the division

Continued on next left-hand page

MORE POWER at LESS COST



New power is worthy of your concentrated study with respect to its greater earning capacity and improved operating economy.

Modern locomotives provide at least 25 to 30% more power at speeds than motive power units ten years old and over, and cost less to operate and maintain.

New locomotives mean increased net revenue.

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

superintendent's office from the latter date to June 23, 1913, he was appointed a brakeman, and on July 4, 1918, a conductor. He held the latter position until November,

William R. Eble

1925, when he was promoted to trainmaster at Brookfield, Mo. On January 1, 1930, he was promoted to assistant to the general manager at Chicago, which position he held until May 16, of that year, when he was made assistant superintendent at Brookfield, Mo. He held the latter position until July 1, 1936, when he was promoted to division superintendent of the Galesburg and Beardstown divisions.

Robert B. Ball, assistant chief engineer of the Atchison, Topeka & Santa Fe System, with headquarters at Chicago, who has been appointed assistant general manager of the Gulf, Colorado & Santa Fe (part of the Santa Fe System), with headquarters at Galveston, Tex., has been associated with the Santa Fe for about 32 years. Mr. Ball was born on December 17, 1880, in Randolph county, Mo., and

Robert B. Ball

obtained his higher education at Leland Stanford university, from which he was graduated in 1904. Previous to graduation from college, Mr. Ball served for a year in the engineering department of the Coast lines of the Santa Fe. In 1904 he re-entered the service of this company as an instrumentman, being advanced to division engineer in 1910. Two years later Mr. Ball was promoted to district engineer, with headquarters at Los Angeles, Cal., and in 1918 he was further promoted to chief engineer of the Coast lines, with the same headquarters. In 1929 he was transferred to Chicago as assistant chief engineer of the system, which position he held until his recent promotion to assistant general manager of the G. C. & S. F., which was effective on July 1.

W. H. Dick, superintendent of the Colorado-Nebraska division of the Chicago, Rock Island & Pacific, who has been appointed general superintendent of the First district, with headquarters at Des Moines, Iowa, as reported in the *Railway Age* of July 4, was born on September 13, 1873, near Leavenworth, Kan. He first entered railway service in May, 1892, as a yard clerk on the Atchison, Topeka & Santa Fe. In October of the same year he was assigned to duty as an operator and served in that capacity on various divisions until 1898, when he was appointed extra dispatcher at La Junta, Colo. Mr. Dick left

W. H. Dick

the Santa Fe in May, 1901, to go with the Rock Island as extra dispatcher at Chickasha, Okla., being advanced to night chief dispatcher at Fort Worth, Tex., in 1907, and to chief dispatcher in May, 1912. He was further promoted to trainmaster on the Indian Territory division in June, 1914, later serving in the same capacity on the Pan Handle, Oklahoma, St. Louis-Kansas City and Kansas divisions. On October 15, 1929, he was appointed superintendent of the Nebraska-Colorado division, with headquarters at Fairbury, Neb., the position he was holding at the time of his recent appointment as general superintendent of the First district.

ENGINEERING AND SIGNALING

J. L. Starkie, office engineer of the Atchison, Topeka & Santa Fe, with headquarters at Gallup, N. M., has been promoted to district engineer of the Eastern district, with headquarters at Topeka, Kan., to succeed **G. J. Bell,** who has retired at his own request after 50 years of service.

OBITUARY

C. N. Souther, who retired as general passenger agent of the Chicago, Milwaukee, St. Paul & Pacific in 1919, died in Oakland, Cal., on July 4, at the age of 78.

T. Thompson, roadmaster on the Atchison, Topeka & Santa Fe, with headquarters at Joliet, Ill., died in that city on July 5 after an illness of several weeks. Mr. Thompson was the senior active member of the Roadmasters and Maintenance of Way Association and served that organization as president in 1911.

Woodson G. Johnston, superintendent of car service of the Columbus & Greenville, with headquarters at Columbus, Miss., died in that city on June 28, following an illness covering several months. He was born in Lumpkin, Ga., and began his railroad career as an apprentice mechanic with the Atlanta, Birmingham & Coast at Waycross, Ga. Successively he served with the Louisville & Nashville, at Montgomery, Ala., doing office work; and with the Southern, at Birmingham, as chief clerk in the mechanical department. In 1910 he was appointed chief clerk to the master mechanic of the Southern, and in 1918 was made chief clerk to the superintendent. When the Columbus & Greenville was organized he continued in that capacity, and two years later was promoted to car accountant. In 1932 he was appointed superintendent of car service, the position he was holding at the time of his death.

Harry Duncan Earl, general manager of the Texas & Pacific, with headquarters at Dallas, Tex., who died in a hospital in that city on June 30, was born at Martin, Ohio, on March 28, 1879, and entered railway service in June, 1896, in the operating department of the Lake Shore & Michigan Southern (now New York Central) at Amherst, Ohio. From 1897 to 1898 he was a telegraph operator for the Toledo, St. Louis & Kansas (now the Toledo, St. Louis & Western), while from the latter date to 1907 he was a telegraph operator, a dispatcher and a chief dispatcher for the St. Louis-Southwestern. From 1907 to 1910 he was a trainmaster at Tyler, Tex., and in the latter year was promoted to assistant superintendent, which position he held until 1911, when he was promoted to division superintendent at Mount Pleasant, Tex. In 1916 he resigned to become general superintendent of the Midland Valley at Muskegee, Okla. In 1917 he returned to the Cotton Belt as superintendent at Pine Bluff, Ark., and from August to December, 1918, during federal control, was general superintendent of the St. Louis-Southwestern of Texas, the International & Great Northern, the Trinity branch of the Missouri, Kansas & Texas of Texas, the Beaumont & Great Northern, the Galveston, Houston & Henderson and the Houston & Brazos Valley. From 1918 to 1920 he served as general superintendent of the Texas & Pacific, the Trans-Mississippi Terminal and the Weatherford, Mineral Wells & North Western. In 1920, at the end of federal control, he was made general superintendent of the Texas & Pacific, which position he held until 1928, when he was promoted to general manager, the position he was holding at the time of his death.

Tables of Revenues and Expenses of Railways begin on next left-hand page.

SLACK

IN DRIVING BOX FIT IS A CONSTANT BANG!

EVEN if driving-box wedges could be adjusted accurately by hand in the roundhouse they wouldn't be in adjustment ten miles later.

Slack is caused by clearance whether from wear or improper adjustment. Temperature change at road speeds causes expansion and contraction of the box, that should be compensated for when it occurs. This temperature fluctuates 250° over short periods and it cannot be cared for by rigidly anchored wedges.

Franklin Automatic Compensator and Snubber automatically compensates for wear and for box expansion. It maintains accurate driving box fit all the time and prevents hard riding.

In addition, it exerts a pre-determined yielding resistance that cushions unusual shocks which cause excessive stresses and failure.

Its twin, the Type E-2 Radial Buffer, prevents all slack between engine and tender by frictional resistance. This dampens oscillations and further makes for easier riding.

When maintenance is required a replacement part assumes importance equal to that of the device itself and should be purchased with equal care. Use only genuine Franklin repair parts in Franklin equipment.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1936

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr. & retir. 1936	1935	Before depr. & ret.
Akron, Canton & Youngstown	May	171	$180,250	$14	$191,147	$31,861	$16,689	$8,387	$52,525	$118,528	62.0	$72,619	$59,843	$39,406	$21,234	$43,909
	5 mos.	171	861,175	228	922,314	138,656	83,342	41,087	262,510	571,683	62.0	350,631	292,100	198,826	174,997	221,213
Alton	May	956	906,475	158,659	1,234,407	229,082	198,679	48,455	491,697	1,026,065	83.1	208,342	117,051	—38,077	—261,793	—5,758
	5 mos.	956	4,528,897	816,944	6,198,282	774,277	1,116,391	228,074	2,530,524	4,960,161	80.0	1,238,121	809,252	—24,554	—298,422	116,635
Atchison, Topeka & Santa Fe System	May	13,234	9,077,874	1,206,167	11,411,442	2,302,578	2,963,935	435,596	4,393,095	10,499,242	92.0	912,200	—230,621	—139,487	2,541,813	807,206
	5 mos.	13,234	45,317,483	5,754,347	56,199,818	9,060,025	14,266,553	2,077,912	21,435,277	49,041,757	87.3	7,158,061	1,870,841	1,947,531	3,728,299	6,674,911
Atlanta & West Point	May	93	96,670	20,288	139,426	20,159	25,963	8,254	57,999	121,829	87.4	17,597	10,767	—8,260	—13,332	1,107
	5 mos.	93	476,535	107,089	696,615	90,889	137,745	40,541	295,369	612,706	87.9	83,909	48,657	—19,440	—40,208	27,718
Western of Alabama	May	133	89,233	21,232	124,466	24,369	28,338	7,073	50,426	118,729	95.4	5,737	—2,856	—7,176	—4,868	6,622
	5 mos.	133	434,510	109,776	619,155	103,515	152,558	35,305	255,663	588,388	95.0	30,767	—12,521	—1,884	—43,870	67,342
Atlanta, Birmingham & Coast	May	639	208,252	8,253	252,451	42,179	49,951	22,984	99,861	243,762	96.5	8,689	—5,033	—16,568	—17,962	—5,001
	5 mos.	639	1,093,469	115,880	1,370,747	212,082	249,302	110,460	542,883	1,241,143	90.5	129,604	60,764	—24,250	—84,673	35,968
Atlantic Coast Line	May	5,144	2,673,066	428,056	3,551,433	415,747	706,576	113,737	1,418,812	2,825,430	79.6	726,003	201,003	67,312	—67,912	243,718
	5 mos.	5,145	13,875,001	3,864,600	20,158,014	2,077,586	3,451,177	657,960	7,659,377	14,821,230	73.5	5,336,784	2,811,784	2,119,313	1,678,074	3,010,465
Charleston & Western Carolina	May	342	180,118	1,337	186,518	25,287	28,368	6,201	58,245	122,855	65.9	63,663	45,663	41,890	13,089	48,172
	5 mos.	342	890,787	5,759	921,580	130,082	139,681	31,789	305,181	630,858	68.5	290,722	201,722	187,364	175,591	218,862
Baltimore & Ohio	May	6,486	12,506,597	919,237	14,289,737	1,375,396	3,336,636	386,010	4,647,684	10,425,643	73.0	3,864,094	2,959,974	2,472,966	1,546,254	3,087,713
	5 mos.	6,486	57,021,119	4,179,529	65,131,761	5,397,297	15,817,784	1,851,541	23,253,944	49,675,344	76.3	15,456,417	11,407,962	9,636,365	8,822,625	12,714,335
Staten Island Rapid Transit	May	23	43,283	80,621	132,606	12,506	19,846	2,004	80,372	127,133	95.9	5,473	—17,327	—31,382	—41,208	—23,964
	5 mos.	23	249,049	386,116	670,941	62,995	104,390	8,785	435,139	673,746	100.4	—2,805	—106,155	—185,038	—236,845	—147,966
Bangor & Aroostook	May	603	471,048	9,951	503,108	90,921	87,671	5,802	118,589	327,874	65.2	175,234	124,156	133,580	256,417	155,668
	5 mos.	603	2,905,812	105,785	3,117,294	490,833	461,052	24,921	765,586	1,861,683	59.7	1,255,611	940,849	889,995	1,265,982	1,000,484
Bessemer & Lake Erie	May	225	1,380,925	3,698	1,396,803	149,312	263,394	11,963	197,138	660,930	47.3	735,873	584,961	599,629	516,450	653,476
	5 mos.	225	3,832,632	17,566	3,911,617	546,643	1,379,559	56,919	798,828	2,974,907	76.1	936,710	645,503	905,811	502,033	1,175,689
Boston & Maine	May	1,997	2,798,532	473,237	3,800,875	614,692	587,109	64,999	1,512,348	2,964,303	78.0	836,572	535,009	327,274	682,093	464,006
	5 mos.	1,997	13,275,171	2,614,193	18,317,317	3,523,734	3,238,850	308,930	7,927,518	15,933,555	87.0	2,383,762	1,035,106	10,153	2,362,197	694,778
Brooklyn Eastern District Terminal	May	12.41	111,241	.....	113,527	6,274	11,872	1,103	29,799	55,743	49.1	57,784	50,230	50,292	36,702	.....
	5 mos.	12.41	507,608	.....	519,112	21,683	41,355	2,597	146,766	244,541	47.1	274,571	233,055	233,991	159,126	.....
Burlington-Rock Island	May	255	48,027	6,226	58,523	18,132	11,587	3,721	34,527	75,184	128.5	—16,661	—24,038	—30,872	—30,599	—28,896
	5 mos.	255	276,027	22,774	324,535	72,276	63,886	19,278	186,346	378,933	116.8	—54,398	—89,278	—133,537	—139,897	—122,628
Cambria & Indiana	May	37	80,522	.....	80,666	10,713	117,624	399	11,002	145,314	180.14	—64,648	—69,169	—1,589	69,504	14,127
	5 mos.	37	498,228	.....	499,023	36,301	350,857	1,900	65,217	482,177	96.62	16,846	—68,541	279,885	404,159	359,032
Canadian Pacific Lines in Maine	May	233	134,432	13,464	160,136	54,343	36,037	9,586	59,343	166,402	103.9	—6,266	—15,487	—33,881	—38,764	—31,811
	5 mos.	233	1,006,000	67,864	1,131,830	186,924	248,431	48,203	435,023	955,428	84.4	176,402	132,019	23,642	30,330	33,927
Canadian Pacific Lines in Vermont	May	85	75,862	6,411	94,005	25,333	31,992	4,261	58,323	125,299	133.3	—31,294	—39,278	—57,873	—36,264	—57,873
	5 mos.	85	319,193	34,631	406,280	107,321	137,735	21,496	297,669	592,224	145.8	—185,944	—220,420	—312,779	—212,205	—312,779
Central of Georgia	May	1,926	982,504	96,044	1,232,727	161,994	276,229	52,799	504,926	1,077,342	87.4	155,385	50,766	30,644	25,924	94,809
	5 mos.	1,926	4,999,434	556,587	6,338,842	800,193	1,355,349	260,602	2,640,924	5,474,036	86.4	864,806	389,993	254,897	167,830	575,812
Central of New Jersey	May	681	2,012,048	351,554	2,529,175	200,445	550,686	46,481	1,096,726	2,010,964	79.5	518,211	181,180	52,635	414,289	180,752
	5 mos.	681	10,512,074	1,683,574	12,986,735	997,978	2,630,833	226,085	5,592,506	10,019,619	77.1	2,967,116	1,293,663	548,751	1,370,285	1,189,182
Central Vermont	May	453	473,722	21,715	540,134	120,389	97,015	15,304	258,233	514,529	95.3	25,605	1,671	3,987	60,756	32,465
	5 mos.	454	1,955,746	140,720	2,295,818	404,699	476,599	71,638	1,187,724	2,256,115	98.3	39,703	—57,752	—49,274	72,505	92,619
Chesapeake & Ohio	May	3,106	10,495,296	305,523	11,257,697	1,020,465	1,931,701	199,699	2,331,870	5,797,196	51.5	5,460,501	4,470,179	4,337,645	2,618,687	5,043,376
	5 mos.	3,106	49,410,234	1,315,450	52,427,902	5,107,242	9,719,798	951,755	11,582,848	28,945,737	55.2	23,482,165	18,595,401	19,002,525	13,751,662	22,526,434
Chicago & Eastern Illinois	May	931	947,136	89,132	1,195,907	156,564	222,669	54,149	460,639	955,742	79.9	240,165	165,165	21,977	—27,268	70,713
	5 mos.	931	5,154,308	496,209	6,412,838	710,629	1,162,311	275,515	2,504,319	4,964,221	77.4	1,448,617	1,073,617	358,021	237,364	606,206
Chicago & Illinois Midland	May	131	246,454	1,276	253,722	27,492	49,385	16,403	66,545	177,307	69.9	76,415	63,367	68,154	76,979	81,769
	5 mos.	131	1,362,229	7,221	1,401,325	127,303	276,294	86,380	377,688	956,207	68.2	445,118	372,369	375,438	376,405	443,572
Chicago & North Western	May	8,355	5,845,160	754,702	7,385,261	1,886,136	1,870,802	166,632	2,806,431	7,061,286	95.6	323,975	—321,844	—404,715	253,326	8,548
	5 mos.	8,355	26,114,956	3,661,583	33,439,113	5,734,303	8,311,775	769,891	14,620,218	31,109,905	93.0	2,329,208	—790,797	—1,729,390	667,701	351,745
Chicago, Burlington & Quincy	May	9,013	5,663,895	606,156	7,059,751	1,545,926	1,299,923	268,353	2,674,662	6,131,404	86.9	928,347	237,655	—144,050	240,394	237,661
	5 mos.	9,016	29,851,145	2,846,099	36,475,214	4,832,697	6,841,574	1,140,761	13,972,418	28,540,901	78.2	7,934,313	4,729,927	2,957,966	1,390,687	4,871,498
Chicago Great Western	May	1,512	1,384,958	40,727	1,517,271	200,692	216,073	53,577	529,598	1,051,479	69.3	465,792	382,920	205,870	116,061	247,195
	5 mos.	1,512	6,092,631	230,362	6,788,209	1,088,346	1,037,810	264,402	2,827,085	5,478,354	80.7	1,309,855	952,470	69,673	—57,466	275,655
Chicago, Indianapolis & Louisville	May	572	617,793	53,466	768,617	78,072	209,619	29,052	311,563	664,859	86.5	103,758	59,719	—50,975	86,314	—9,449
	5 mos.	572	3,425,119	258,241	4,144,661	364,229	996,063	143,442	1,662,010	3,340,976	80.6	803,685	614,712	92,942	—60,303	301,074

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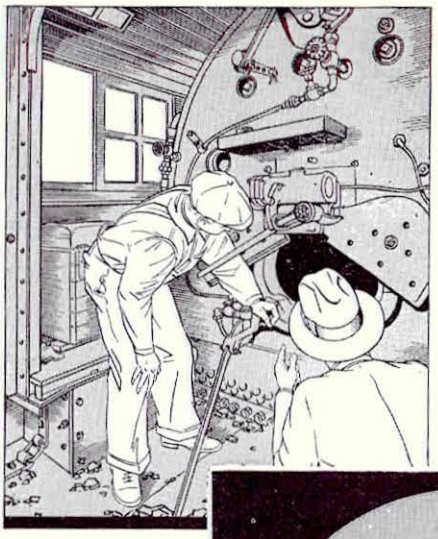

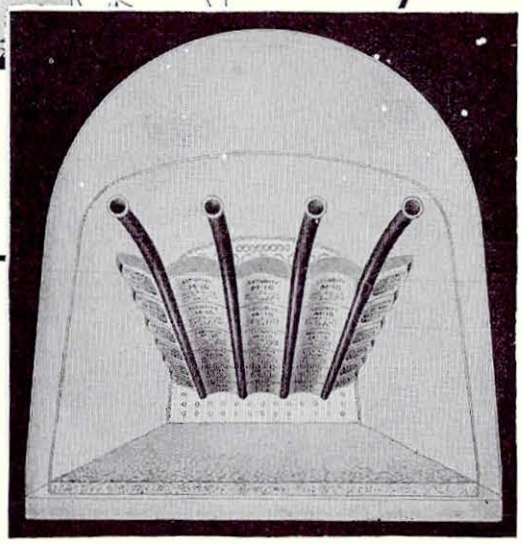

Security Arch Service

SAVES DOLLARS FOR YOU

For many years locomotive combustion and its relation to Arch Brick has been the study of American Arch Company Engineers.

Designs have been constantly improved and developed so that today the Security Arch performs more efficiently than ever before.

During this time was perfected "special service of supply" that assures proper quality and type of Security Brick promptly available at all points of consumption.

Measured in terms of thousands of ton miles the Security Arch renders greater service than it did when conditions were less severe.

There's More to SECURITY ARCHES *Than Just Brick*

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr.& retir. 1936	After depr.& retir. 1935	Before depr.& ret.
Chicago, Milwaukee, St. Paul & Pacific	May	11,129	$7,121,740	$513,219	$8,425,613	$2,180,245	$1,673,546	$212,734	$3,149,065	$7,520,768	89.3	$904,845	$190,845	—$310,265	$1,501,010	$136,091
	5 mos.	11,127	34,686,438	2,550,831	41,078,300	6,079,005	8,155,226	996,522	16,697,646	33,535,859	81.6	7,542,441	4,276,441	1,806,389	2,130,071	4,048,025
Chicago, Rock Island & Pacific	May	7,574	4,658,209	499,394	5,769,078	812,491	1,524,782	200,356	2,505,846	5,438,484	94.3	330,594	—158,098	—444,614	—382,838	—87,056
	5 mos.	7,574	22,684,772	2,736,288	28,333,827	3,578,196	7,204,327	957,687	12,865,245	26,559,692	93.7	1,774,135	—507,233	—1,924,142	—1,092,180	—129,155
Chicago, Rock Island & Gulf	May	626	216,091	28,042	319,114	55,835	45,257	15,947	126,193	269,712	84.5	49,402	25,676	—21,050	—17,017	—17,028
	5 mos.	626	1,156,976	136,924	1,666,133	251,356	179,347	79,780	635,354	1,276,124	76.6	390,009	283,877	44,580	—86,702	65,024
Chicago, St. Paul, Minneap. & Omaha	May	1,648	1,195,716	109,438	1,407,236	190,000	264,452	35,262	636,614	1,201,683	85.4	205,553	104,283	2,444	—14,155	52,072
	5 mos.	1,648	5,725,603	579,066	6,791,631	838,168	1,252,188	169,558	3,583,008	6,233,361	91.8	558,270	68,247	—449,781	—187,489	—200,466
Clinchfield	May	309	444,571	4,167	453,982	39,812	122,827	18,349	91,445	286,339	63.1	167,643	113,958	155,989	95,690	199,561
	5 mos.	309	2,507,519	20,122	2,554,973	196,473	569,037	87,429	514,851	1,442,634	56.5	1,112,339	900,630	1,068,085	790,236	1,286,073
Colorado & Southern	May	1,021	474,630	26,830	549,034	77,781	111,789	15,453	216,280	454,751	82.8	94,283	29,293	7,940	—5,011	39,510
	5 mos.	1,021	2,251,976	126,206	2,637,072	294,986	547,852	64,668	1,116,614	2,194,444	83.2	442,628	135,199	46,632	—158,967	204,972
Fort Worth & Denver City	May	902	359,219	37,521	403,342	53,918	89,556	17,798	157,592	353,344	87.6	49,998	14,730	—11,659	9,849	5,910
	5 mos.	902	2,059,528	182,724	2,245,277	196,862	425,547	85,856	762,580	1,646,905	73.3	598,372	435,367	288,480	51,548	377,205
Columbus & Greenville	May	167	78,834	6,316	90,472	17,391	15,828	4,000	33,977	81,083	89.6	9,389	5,545	4,669	—4,986	7,468
	5 mos.	167	374,836	28,742	429,050	84,434	72,217	18,746	177,983	403,367	94.0	25,683	9,189	3,381	—23,965	17,351
Delaware & Hudson	May	831	2,105,461	74,590	2,269,474	283,274	490,571	45,306	791,504	1,744,115	76.9	525,359	380,530	356,844	613,754	447,769
	5 mos.	831	9,419,389	439,850	10,279,318	1,362,628	2,509,452	221,195	3,975,638	8,747,552	85.1	1,531,766	886,159	940,791	961,868	1,403,776
Delaware, Lackawanna & Western	May	984	3,101,880	551,739	4,127,309	444,677	678,696	119,497	1,828,940	3,262,909	79.1	864,400	529,400	503,676	575,265	726,276
	5 mos.	990	15,296,611	2,822,700	20,324,538	1,663,201	3,808,168	571,923	9,431,966	16,416,716	80.8	3,907,822	2,233,822	2,162,088	2,018,601	3,276,009
Denver & Rio Grande Western	May	2,584	1,761,964	84,013	1,947,387	442,066	562,938	55,893	677,423	1,815,243	93.2	132,144	—73,830	—171,941	—48,352	—75,349
	5 mos.	2,584	8,223,825	503,337	9,171,663	1,265,724	2,729,346	252,352	3,199,168	7,859,963	85.7	1,311,700	378,511	126,145	359,673	608,365
Denver & Salt Lake	May	232	133,803	6,844	149,465	50,451	74,719	2,192	45,074	175,549	117.5	—26,084	—47,732	—3,846	61,106	1,135
	5 mos.	232	1,016,784	40,863	1,100,123	150,610	324,214	10,776	281,411	807,940	73.4	292,183	195,609	376,581	388,147	403,056
Detroit & Mackinac	May	242	54,247	1,876	62,015	14,247	10,449	910	22,395	51,521	83.1	10,494	7,988	4,350	—2,860	7,315
	5 mos.	242	196,897	13,806	238,199	42,325	51,077	4,548	112,466	227,194	95.4	11,005	8,346	—7,140	—11,281	7,684
Detroit & Toledo Shore Line	May	50	295,902	.....	297,257	29,004	24,438	8,122	70,507	139,664	47.0	157,593	127,673	74,928	56,349	80,487
	5 mos.	50	1,789,226	.....	1,797,675	129,427	129,325	38,952	417,132	751,939	41.8	1,045,736	865,353	564,552	487,912	592,348
Detroit, Toledo & Ironton	May	472	594,429	177	610,049	70,926	73,597	10,829	130,075	311,667	51.1	298,382	232,383	195,203	214,099	217,212
	5 mos.	472	3,466,871	1,116	3,532,776	297,846	426,122	52,911	731,334	1,628,323	46.1	1,904,453	1,534,834	1,332,011	1,751,695	1,441,041
Duluth, Missabe & Northern	May	559	2,110,699	2,889	2,399,583	154,691	216,306	3,711	317,204	740,740	30.9	1,658,843	1,214,213	1,214,313	1,172,674	1,289,285
	5 mos.	559	2,491,484	13,196	2,874,285	592,788	1,037,219	18,050	876,050	2,752,874	95.8	121,411	—503,452	—497,615	—383,985	—122,517
Duluth, Winnipeg & Pacific	May	178	96,337	1,387	100,335	29,533	16,028	1,877	40,712	92,881	92.6	7,454	56	—15,616	—5,285	—12,115
	5 mos.	178	557,438	9,769	580,408	99,112	94,282	8,877	241,098	465,009	80.1	115,399	77,612	—7,832	—40,387	8,284
Elgin, Joliet & Eastern	May	434	1,287,054	Dr. 148	1,538,319	152,219	322,024	13,887	541,008	1,076,621	70.0	461,698	332,569	287,411	308,296	362,265
	5 mos.	434	6,590,054	12	7,450,099	659,081	1,549,084	68,612	2,622,061	5,131,715	68.9	2,318,384	1,717,857	1,601,504	1,278,201	1,976,965
Erie	May	2,297	5,910,478	418,226	6,892,765	640,203	1,309,640	171,060	2,423,833	4,848,721	70.3	2,044,044	1,550,319	1,277,924	1,002,686	1,602,241
	5 mos.	2,297	28,393,593	2,088,172	32,905,275	2,630,886	6,343,749	839,271	12,434,959	23,760,162	72.2	9,145,113	7,046,367	5,885,851	4,793,568	7,509,454
New Jersey & New York	May	45	17,731	47,604	67,289	4,654	15,090	585	48,679	70,735	105.1	—3,446	—8,701	—25,059	—38,800	—25,048
	5 mos.	45	80,429	240,461	330,194	22,978	74,081	3,116	248,929	357,173	108.2	—26,979	—49,930	—128,501	—190,000	—128,446
New York, Susquehanna & Western	May	215	238,163	24,344	274,314	27,433	33,124	4,726	117,694	196,354	71.6	77,960	52,844	25,601	32,789	31,273
	5 mos.	215	1,337,569	119,700	1,523,565	127,130	182,787	23,745	667,022	1,067,925	70.1	455,640	340,638	211,232	152,546	240,316
Florida East Coast	May	712	607,015	104,613	781,269	106,303	126,064	22,048	227,859	527,562	67.5	253,707	173,211	111,224	112,723	168,639
	5 mos.	712	2,824,798	1,479,894	4,815,022	499,390	651,976	119,107	1,443,602	3,019,362	62.7	1,795,660	1,403,355	1,154,504	795,834	1,441,539
Fort Smith & Western	May	249	42,947	1,308	47,328	15,636	8,262	5,617	18,992	51,435	108.7	—4,107	—5,907	—12,310	—16,562	—11,741
	5 mos.	249	283,813	4,529	305,281	73,971	44,786	26,556	101,512	263,493	86.3	41,788	32,788	—551	—33,760	2,295
Georgia Railroad	May	329	247,773	13,336	283,940	30,767	64,962	17,416	123,801	250,882	88.4	33,058	26,741	38,880	36,791	50,146
	5 mos.	329	1,239,312	62,791	1,421,633	143,138	297,669	85,974	620,004	1,215,168	85.5	206,465	174,989	222,512	209,279	279,802
Georgia & Florida	May	408	73,056	2,162	79,120	24,006	14,930	8,188	33,430	86,205	109.0	—7,085	—14,126	—13,945	—5,745	—8,765
	5 mos.	408	402,196	9,978	432,179	111,147	82,404	41,308	169,924	432,866	100.2	—687	—32,612	—37,749	—19,348	—11,541
Grand Trunk Western	May	1,032	2,074,319	65,390	2,278,442	283,848	364,172	37,113	790,466	1,562,162	68.6	716,280	614,577	540,786	199,961	630,078
	5 mos.	1,032	9,130,609	341,343	10,187,503	1,059,429	1,858,443	174,058	3,990,120	7,523,492	73.9	2,664,011	2,137,374	1,833,016	920,637	2,320,613
Canadian Nat'l Lines in New Eng.	May	172	82,050	2,858	93,788	58,529	20,161	2,591	55,694	145,482	155.1	—51,694	—67,175	—97,911	—77,620	—94,866
	5 mos.	172	475,924	20,856	541,285	197,351	107,791	11,989	301,237	663,451	122.5	—122,166	—193,834	—329,480	—334,682	—314,730
Great Northern	May	8,250	6,706,539	362,140	7,691,509	767,923	1,177,174	194,811	2,237,813	4,634,978	60.3	3,056,531	2,302,495	2,200,179	1,939,840	2,503,968
	5 mos.	8,250	24,384,711	1,750,304	28,584,239	2,687,627	5,507,413	874,085	11,049,556	21,436,780	75.0	7,147,459	4,619,837	4,238,262	3,948,626	5,778,529

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The Superheater

AS A FACTOR IN LOCOMOTIVE DESIGN

Each of the following features is being discussed in this series of advertisements.

Maximum Ton Miles per Hour

•

Boiler Capacity and Tractive Effort

•

Heating Surface and Boiler Capacity

•

Heating Surface and Boiler Efficiency

•

Minimum Draft Loss and Low Back Pressure

•

High Sustained Superheat

•

Higher Superheat and Minimum Steam Consumption

•

Greater Sustained Capacity

•

Reduced Fuel and Water Consumption per Unit of Work Done

•

Total Fuel Consumption of American Railroads

•

Reduced Cost of Locomotive Horsepower

For High Efficiencies Use Elesco Type "E" Superheaters

✓

✓

✓

3

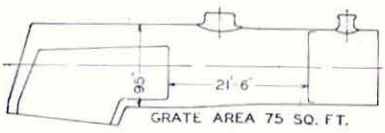
Heating Surface and Boiler Capacity

High sustained boiler capacity with highest boiler efficiency requires, among other things, a boiler with the largest heating surface within clearance limits.

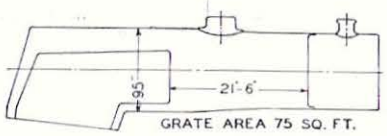
The tabulation below compares two typical boilers in actual service with the same outside diameter and length, one designed for the type "A" superheater and the other for the type "E" superheater.

The increase in evaporating surface, made possible with the type "E" superheater design in the same size of boiler, is quite substantial.

An increase of from 8% to 14% in evaporating surface, and from 50% to 80% in superheating surface is usually possible.



TYPE "A"



TYPE "E"

ITEM	TYPE "A" Superheater	TYPE "E" Superheater	INCREASE	INCREASE Per Cent
Tube and flue heating surface	4,200 sq. ft.	4,641 sq. ft.	441 sq. ft.	10.5
Superheating surface	1,164 sq. ft.	2,088 sq. ft.	924 sq. ft.	79.3
Gas area	1,337 sq. in.	1,374 sq. in.	37 sq. in.	2.76
Steam area	51.3 sq. in.	67.06 sq. in.	15.76 sq. in.	30.7

THE SUPERHEATER COMPANY

Representative of American Throttle Company, Inc.

60 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

Canada: The Superheater Company, Limited, Montreal

Superheaters • Superheated Steam Pyrometers • Exhaust Steam Injectors • Feed Water Heaters • American Throttles

Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr. & retir. 1936	1935	Before depr. & ret.
Green Bay & Western	May	234	$124,567	$559	$129,708	$31,627	$19,658	$6,149	$44,949	$106,949	82.4	$22,759	$11,591	$2,087	$14,592	$6,086
	5 mos.	234	612,883	3,726	639,261	132,883	82,472	29,271	223,813	489,585	76.5	149,676	104,434	71,543	82,373	92,054
Gulf & Ship Island	May	259	96,443	7,525	119,232	18,707	13,894	3,404	53,670	96,466	80.9	22,766	7,338	—2,471	—10,535	1,441
	5 mos.	259	514,378	38,463	627,215	91,010	73,085	17,091	298,946	512,252	81.7	114,963	40,941	—8,350	—46,735	12,028
Gulf, Mobile & Northern	May	936	559,447	23,184	606,074	65,826	85,383	37,641	158,490	380,630	62.80	225,444	173,444	112,458	155,394	131,482
	5 mos.	936	2,632,555	110,680	2,858,567	319,505	444,515	179,724	776,842	1,865,241	65.25	993,326	767,547	468,357	325,049	563,380
Illinois Central	May	4,974	6,237,944	655,067	7,799,017	777,943	1,777,330	228,809	2,954,719	6,136,376	78.7	1,662,641	1,020,419	725,104	347,937	1,270,132
	5 mos.	4,977	32,150,758	3,623,765	39,152,405	3,385,104	8,677,805	1,153,216	15,402,749	30,659,683	78.3	8,492,722	5,526,118	4,503,293	4,258,849	7,249,402
Yazoo & Mississippi Valley	May	1,619	1,070,067	66,906	1,238,154	90,302	169,843	33,819	456,008	803,240	64.9	434,914	298,011	206,039	31,734	248,678
	5 mos.	1,619	4,855,952	303,965	5,573,785	454,268	893,862	168,737	2,263,598	4,053,695	72.7	1,520,090	870,304	444,544	—90,478	657,265
Illinois Central System	May	6,593	7,308,011	721,973	9,037,171	868,245	1,940,173	262,628	3,410,727	6,939,616	76.8	2,097,555	1,315,972	940,343	386,171	1,528,010
	5 mos.	6,596	37,006,710	3,927,730	44,726,190	3,839,372	9,571,667	1,321,953	17,666,347	34,713,378	77.6	10,012,812	6,384,979	4,988,937	4,205,946	7,947,767
Illinois Terminal	May	508	379,755	69,426	488,894	55,008	67,971	14,932	156,913	312,069	63.83	176,825	140,212	123,731	87,449	142,728
	5 mos.	515	1,903,890	348,811	2,434,758	229,014	330,859	79,171	814,563	1,543,161	63.38	891,597	722,489	629,488	430,253	724,362
Kansas City Southern	May	878	1,033,304	19,974	1,163,937	95,774	167,804	48,268	319,433	697,891	60.0	466,046	378,046	296,383	90,690	325,545
	5 mos.	878	4,593,525	79,360	5,181,862	443,130	790,569	239,202	1,484,814	3,302,033	63.7	1,879,829	1,465,829	1,163,745	328,856	1,306,942
Kansas, Oklahoma & Gulf	May	326	190,353	466	193,592	27,776	20,012	7,664	42,857	97,069	50.1	96,523	74,484	51,847	43,927	53,934
	5 mos.	326	964,471	2,355	979,559	105,741	108,337	38,539	208,380	478,142	48.8	501,417	403,692	314,772	199,151	325,202
Lake Superior & Ishpeming	May	160	302,572	82	346,287	35,327	25,692	536	44,918	112,406	32.5	233,881	188,364	187,129	93,295	200,437
	5 mos.	160	445,280	470	498,709	117,929	143,477	2,784	137,426	431,106	86.4	67,603	—40,286	—46,016	—78,531	20,458
Lehigh & Hudson River	May	96	143,065	87	143,983	21,252	18,768	3,626	46,733	96,834	67.3	47,149	33,110	20,476	15,292	24,273
	5 mos.	96	643,431	561	648,178	69,526	99,833	17,818	240,760	460,725	71.1	187,453	124,429	62,127	85,936	81,093
Lehigh & New England	May	219	410,473	224	413,327	39,475	70,724	6,192	123,448	255,504	61.8	157,823	118,037	102,709	131,975	120,726
	5 mos.	219	1,676,405	1,425	1,689,985	170,270	352,438	31,068	587,415	1,220,264	72.2	469,721	363,375	353,632	365,983	444,294
Lehigh Valley	May	1,334	3,454,697	201,719	3,929,485	245,399	660,784	114,779	1,671,988	2,863,851	72.9	1,065,634	858,669	705,615	641,158	896,987
	5 mos.	1,336	17,109,399	1,084,163	19,500,161	1,278,519	3,465,066	557,919	8,780,801	14,906,742	76.4	4,593,419	3,574,799	2,711,368	2,481,487	3,670,649
Louisiana & Arkansas	May	606	460,505	9,033	489,213	70,716	66,721	29,648	120,246	301,176	61.6	188,037	147,019	119,172	107,535	133,528
	5 mos.	606	2,150,089	42,903	2,280,750	300,559	324,312	139,990	582,539	1,431,838	62.8	848,912	644,330	540,880	371,538	612,638
Louisiana, Arkansas & Texas	May	255	106,037	215	112,069	28,438	12,242	4,755	34,938	85,086	75.9	26,983	22,241	5,644	7,493	6,395
	5 mos.	255	475,703	937	497,392	125,406	50,452	22,819	155,970	378,152	76.0	119,240	99,701	22,467	—8,864	26,202
Louisville & Nashville	May	4,999	6,167,743	493,635	7,203,276	702,997	1,545,896	178,933	2,456,632	5,194,552	72.1	2,008,724	1,541,275	1,488,891	1,035,338	1,837,586
	5 mos.	5,005	30,293,416	2,471,203	35,440,312	3,623,879	8,282,380	924,713	12,242,029	26,670,744	75.3	8,769,568	6,430,584	6,606,687	5,071,846	8,349,832
Maine Central	May	1,046	836,525	58,620	993,593	169,422	165,839	9,622	339,164	720,972	72.6	272,621	204,321	175,224	244,272	219,739
	5 mos.	1,046	4,299,050	332,970	5,088,017	955,802	917,792	51,672	1,963,288	4,085,321	80.3	1,002,696	683,068	359,207	639,080	582,301
Midland Valley	May	351	97,129	5	99,337	21,938	13,120	2,287	27,259	69,836	70.3	29,501	20,891	15,737	20,595	17,866
	5 mos.	357	580,107	85	588,469	69,166	60,242	11,780	151,640	321,493	54.6	266,976	226,317	187,082	113,526	197,698
Minneapolis & St. Louis	May	1,579	690,179	8,899	738,345	90,804	123,613	36,773	287,849	576,738	78.1	161,607	115,172	77,121	—53,676	105,475
	5 mos.	1,606	3,114,364	58,768	3,351,114	407,313	607,255	175,362	1,518,894	2,889,696	86.2	461,418	269,789	40,469	—176,800	185,409
Minneapolis, St. Paul & S. S. Marie	May	4,296	2,075,552	76,100	2,337,725	321,921	354,888	60,220	845,954	1,695,321	72.5	642,404	476,135	342,052	348,006	443,567
	5 mos.	4,296	8,610,462	398,059	9,775,405	1,398,488	1,814,976	287,921	4,406,716	8,453,892	86.5	1,321,513	559,113	—45,335	—589,832	465,446
Duluth, South Shore & Atlantic	May	550	272,879	8,720	309,629	33,370	37,097	4,312	79,207	159,195	51.4	150,434	137,641	129,069	83,329	136,771
	5 mos.	550	869,736	50,353	995,048	147,661	171,993	21,055	405,913	772,365	77.6	222,683	170,608	135,092	50,081	173,994
Spokane International	May	163	55,262	1,178	61,960	15,753	6,964	1,807	20,629	49,642	80.1	12,318	7,249	3,785	2,563	5,416
	5 mos.	163	232,227	7,177	266,420	50,652	31,888	9,265	103,238	216,256	81.2	50,164	27,668	10,408	—31,848	17,445
Mississippi Central	May	150	69,378	1,040	72,818	9,015	11,203	7,105	20,403	52,813	72.5	20,005	16,128	13,611	9,758	15,858
	5 mos.	150	335,202	6,160	352,643	53,340	56,150	34,341	99,540	269,718	76.5	82,925	65,488	48,733	866	59,948
Missouri-Arkansas	May	364	83,028	1,173	90,419	20,011	10,567	4,506	27,765	67,225	74.3	23,194	20,176	11,181	13,874	12,014
	5 mos.	364	374,626	5,783	410,326	87,171	50,444	22,062	142,102	323,572	78.9	86,754	74,441	31,574	21,333	35,747
Missouri-Illinois	May	208	97,949	651	100,254	22,187	13,347	2,532	30,188	73,407	73.2	26,847	20,334	9,667	4,976	13,188
	5 mos.	208	406,390	2,958	417,715	88,668	61,669	11,850	144,302	332,489	79.6	85,226	56,800	12,015	32,106	29,620
Missouri-Kansas-Texas Lines	May	3,293	2,013,292	180,505	2,444,206	320,267	474,492	122,415	865,117	1,928,007	78.9	516,199	337,974	129,104	—75,928	236,213
	5 mos.	3,293	9,993,218	816,337	11,941,205	1,498,145	2,331,918	573,808	4,361,176	9,474,334	79.3	2,466,871	1,610,215	592,565	—502,198	1,127,929
Missouri Pacific	May	7,228	5,735,184	384,263	6,765,031	1,037,805	1,406,547	234,182	2,511,575	5,507,451	81.4	1,257,580	796,042	311,320	893,152	661,106
	5 mos.	7,228	29,542,651	1,824,743	34,282,900	4,373,908	7,070,006	1,153,123	12,953,640	27,052,072	78.9	7,230,828	5,108,123	2,732,244	1,484,897	4,483,990
Gulf Coast Lines	May	1,763	931,055	31,609	1,019,737	173,240	189,301	42,570	310,540	766,159	75.13	253,578	184,888	69,065	168,851	102,691
	5 mos.	1,763	5,309,908	160,371	5,744,048	807,810	945,435	214,869	1,667,575	3,871,194	67.39	1,872,854	1,560,885	872,189	594,550	1,043,970

Continued on next left-hand page

ALCO

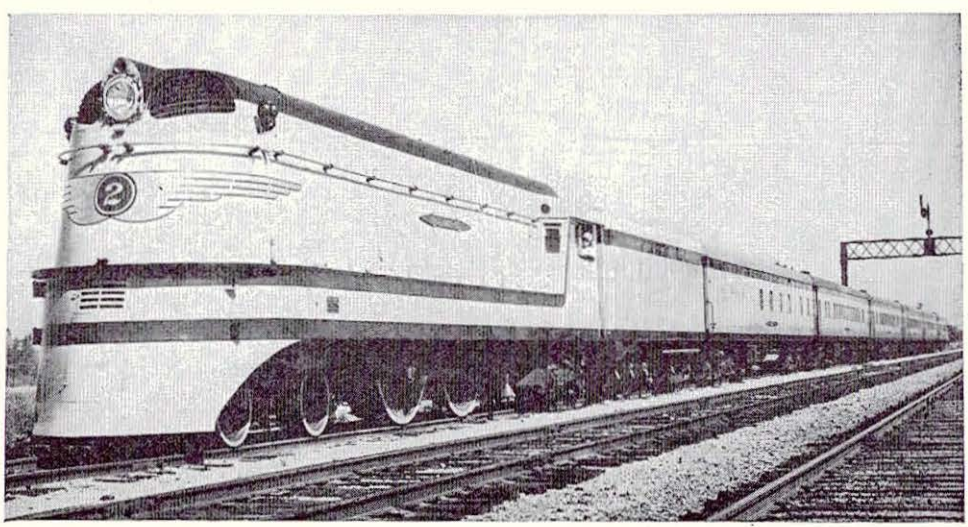
Q.E.D.

IN our advertisement in Railway Age, May 11, 1935, we stated:

"The American Locomotive Company sincerely feels that this engine embodies more thought and ingenuity and refinement of design than any other locomotive that has ever been built. With full knowledge that the eyes of the railway world are on this locomotive, we wish to further express our confident opinion that steam has again marked the beginning of a new era in railway passenger traffic."

Eighteen days after this advertisement appeared, May 29, 1935, the Hiawatha was placed in operation. The two hundred thousandth passenger to travel on the Hiawatha boarded the train at Chicago on March 31, 1936. In other words, in its 10 months of operation the Hiawatha has averaged 20,000 passengers per month. Based on this 10 months of operation, it is earning, above operating expenses, including interest and depreciation, at the rate of almost $700,000 per year.

AMERICAN LOCOMOTIVE COMPANY



30 CHURCH STREET · NEW YORK · N.Y.

Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr. & retir. 1936	1935	Before depr. & ret.
International Great Northern	May	1,154	$852,227	$54,148	$996,847	$146,299	$192,893	$30,107	$417,768	$839,056	84.17	$157,791	$103,302	—$11,661	$215,147	$18,133
	5 mos.	1,154	4,042,796	297,776	4,823,288	700,715	970,147	149,392	2,002,894	4,095,737	84.92	727,551	480,852	—14,476	310,036	135,287
Mobile & Ohio	May	1,201	786,946	27,477	861,359	110,905	195,462	40,791	313,772	700,444	81.3	160,915	108,238	50,050	14,236	101,356
	5 mos.	1,201	3,705,766	121,304	4,062,835	510,997	883,398	204,577	1,541,744	3,343,390	82.3	719,445	487,531	212,869	—197,601	469,492
Monongahela	May	171	385,496	636	387,884	41,493	31,001	458	69,153	145,364	37.5	242,520	219,726	138,181	105,824	143,964
	5 mos.	173	1,959,452	4,407	1,973,624	174,771	150,682	2,140	418,823	763,497	38.7	1,210,127	1,102,037	680,748	485,323	709,649
Montour	May	57	173,559	28	174,125	18,577	40,412	847	36,639	102,927	59.1	71,198	53,242	67,240	73,743	78,271
	5 mos.	57	808,026	28	814,297	61,371	192,550	4,603	210,934	506,752	62.2	307,545	226,077	307,279	309,689	362,024
Nashville, Chattanooga & St. Louis	May	1,154	892,572	75,072	1,095,151	158,707	288,016	59,365	429,326	998,123	91.1	97,028	51,920	49,237	30,349	93,550
	5 mos.	1,154	4,454,663	454,512	5,550,459	695,162	1,307,470	315,347	2,266,446	4,912,763	88.5	637,696	410,309	342,921	189,736	564,922
Nevada Northern	May	165	46,530	2,257	53,642	8,157	3,249	904	9,271	26,297	49.0	27,345	19,313	21,881	6,086	27,833
	5 mos.	165	200,382	7,396	232,431	41,112	15,994	4,324	48,924	130,333	56.7	102,098	63,316	77,047	11,987	106,770
New York Central	May	11,214	20,169,155	4,519,172	28,154,613	2,828,074	6,027,790	543,860	10,464,644	21,250,946	75.5	6,903,667	4,701,023	3,280,984	2,439,953	4,628,859
	5 mos.	11,214	101,960,942	24,147,281	142,029,465	13,507,924	31,289,246	2,619,162	54,077,301	108,793,286	76.6	33,236,179	22,632,323	15,448,569	12,493,615	22,190,624
Pittsburgh & Lake Erie	May	233	1,724,426	55,416	1,824,036	165,927	521,484	25,143	535,516	1,330,733	73.0	493,303	323,992	506,836	345,496	657,382
	5 mos.	233	7,239,670	281,234	7,721,102	676,702	2,428,539	130,034	2,628,698	6,280,613	81.3	1,440,489	796,864	1,686,217	1,376,273	2,438,156
New York, Chicago & St. Louis	May	1,704	3,079,625	79,434	3,273,434	341,504	483,835	111,975	1,066,960	2,132,955	65.2	1,140,479	945,978	667,278	393,488	795,785
	5 mos.	1,704	15,366,010	345,557	16,263,219	1,438,395	2,344,626	568,947	5,564,653	10,552,179	64.9	5,711,040	4,882,634	3,499,962	2,518,303	4,144,588
New York, New Haven & Hartford	May	2,057	3,786,916	1,845,226	6,349,556	876,435	1,125,914	93,752	2,390,624	4,861,500	76.6	1,488,056	998,056	421,495	817,537	707,048
	5 mos.	2,057	17,889,912	9,720,829	31,263,248	4,335,195	5,572,017	427,753	12,212,396	24,560,862	78.6	6,702,386	4,442,386	1,610,818	3,291,675	3,045,799
New York Connecting	May	20	233,125	.....	248,385	12,735	7,890	.....	52,449	74,173	29.9	174,212	139,157	102,367	97,366	102,367
	5 mos.	20	1,131,097	.....	1,190,316	47,211	40,051	.....	174,226	268,104	22.5	922,212	748,817	578,644	557,805	578,644
New York, Ontario & Western	May	566	625,949	18,701	694,655	60,994	118,122	11,897	274,232	488,048	70.3	206,607	159,185	129,541	183,479	154,314
	5 mos.	566	3,366,751	45,184	3,680,006	363,655	693,979	56,673	1,609,104	2,855,984	77.6	824,022	602,921	432,973	515,724	556,957
Norfolk & Western	May	2,166	6,820,747	159,917	7,238,396	857,035	1,127,425	123,611	1,586,456	3,887,914	53.7	3,350,482	2,254,942	2,471,680	1,666,359	2,847,939
	5 mos.	2,166	33,228,552	791,137	35,159,253	4,031,540	5,541,198	617,238	8,141,747	19,397,451	55.2	15,761,802	11,266,415	12,570,164	8,465,748	14,442,611
Norfolk Southern	May	834	325,676	6,764	346,044	72,105	49,898	22,044	137,909	298,035	86.1	48,009	17,014	1,470	—1,278	12,616
	5 mos.	834	1,590,108	30,855	1,703,614	329,161	248,211	112,729	672,500	1,463,749	85.9	239,865	100,163	29,140	49,638	84,207
Northern Pacific	May	6,727	3,920,279	275,679	4,646,091	871,067	1,093,790	184,454	1,706,472	4,186,541	90.1	459,550	—111,201	215,013	68,113	476,873
	5 mos.	6,727	17,847,142	1,364,022	21,248,522	2,654,995	5,313,586	776,081	8,934,607	19,337,259	91.	1,911,263	—723,688	909,835	198,891	2,213,655
Northwestern Pacific	May	351	174,205	74,855	277,264	44,725	52,837	4,504	144,308	260,637	94.0	16,627	1,928	—3,073	—21,195	11,047
	5 mos.	351	862,577	334,776	1,331,584	215,871	253,603	19,331	735,611	1,293,629	97.1	37,955	—25,315	—51,289	—199,664	17,899
Oklahoma City-Ada-Atoka	May	132	48,261	355	50,987	10,699	2,734	761	12,274	28,462	55.8	22,525	20,372	12,994	3,294	13,001
	5 mos.	132	217,645	1,750	230,213	35,979	7,363	3,694	54,004	109,849	47.7	120,364	108,012	81,938	22,904	81,974
Pennsylvania	May	10,442	26,803,001	5,194,285	35,368,797	2,994,395	6,981,266	644,367	12,003,780	24,479,118	69.2	10,889,679	7,771,312	6,895,912	5,369,904	8,772,136
	5 mos.	10,442	126,122,457	27,380,846	168,954,333	15,075,453	34,908,025	3,072,956	61,462,890	123,899,793	73.3	45,054,540	32,548,772	28,473,063	27,154,957	37,464,375
Long Island	May	396	582,947	1,492,706	2,167,432	148,816	347,432	14,333	925,489	1,501,006	69.3	666,426	378,461	223,743	81,483	315,120
	5 mos.	396	2,707,246	6,666,199	9,811,159	766,149	1,790,818	80,418	4,852,576	7,817,845	79.7	1,993,314	1,019,256	258,780	—79,281	743,860
Pennsylvania-Reading Seashore Lines	May	412	270,103	183,624	475,155	53,413	77,905	14,365	261,373	435,421	91.6	39,734	—45,149	—127,684	—189,564	—120,405
	5 mos.	412	1,321,870	634,778	2,049,817	314,237	367,020	42,947	1,296,298	2,159,676	105.4	—109,859	—487,400	—844,457	—1,067,512	—808,006
Pere Marquette	May	2,115	2,480,990	56,823	2,676,405	290,102	539,865	65,227	917,422	1,907,158	71.3	769,247	595,242	473,658	216,337	683,842
	5 mos.	2,115	12,249,794	321,426	13,187,865	1,361,123	2,703,984	317,263	4,843,866	9,697,253	73.5	3,490,612	2,842,606	2,311,085	1,695,681	3,366,953
Pittsburg & Shawmut	May	103	29,126	272	30,044	10,499	14,245	994	11,405	39,955	132.9	—9,911	—11,339	—4,075	—1,416	1,737
	5 mos.	103	228,937	2,077	235,355	59,309	83,586	6,612	78,169	244,129	103.7	—8,774	—15,050	—2,979	36,363	26,077
Pittsburgh & West Virginia	May	138	311,767	.....	327,772	34,310	75,967	16,474	59,315	211,757	64.6	116,015	90,489	122,456	91,907	144,690
	5 mos.	138	1,407,856	.....	1,495,887	134,795	344,751	81,673	299,995	981,810	65.6	514,077	397,065	564,222	403,382	676,419
Pittsburg, Shawmut & Northern	May	190	65,307	101	66,493	20,201	16,133	1,483	26,549	70,901	106.6	—4,408	—6,657	—10,595	—2,602	—7,901
	5 mos.	190	416,702	303	423,932	80,966	84,456	6,901	160,947	366,926	86.5	57,006	45,799	16,335	15,842	29,752
Reading	May	1,456	4,403,923	316,476	4,910,277	323,708	795,717	74,654	1,806,657	3,229,141	65.8	1,681,136	1,252,564	1,252,363	1,023,059	1,517,106
	5 mos.	1,456	21,697,883	1,692,407	24,441,182	1,802,499	4,231,721	367,900	4,568,055	17,127,058	70.1	7,314,124	5,380,478	5,480,180	4,820,968	6,811,101
Richmond, Fredericksburg & Potomac	May	117	392,486	130,860	648,122	66,119	125,203	10,555	248,902	496,201	76.6	151,921	108,093	53,761	49,017	80,736
	5 mos.	117	1,582,092	1,026,101	3,290,919	299,791	644,249	46,334	1,357,115	2,598,886	79.0	692,033	495,700	232,882	298,071	367,915
Rutland	May	407	203,209	28,489	295,195	40,123	52,516	10,772	137,917	255,744	86.6	39,451	26,787	24,631	—9,869	36,377
	5 mos.	407	918,063	152,243	1,337,542	227,957	273,908	51,066	706,142	1,330,678	99.5	6,864	—56,191	—54,524	—89,890	3,339
St. Louis-San Francisco	May	4,928	3,099,780	267,732	3,725,598	553,991	918,775	118,862	1,379,284	3,139,591	84.3	586,007	262,160	261,626	167,957	530,490
	5 mos.	4,928	15,141,468	1,182,270	17,972,633	2,669,028	4,464,713	551,646	6,796,018	15,346,748	85.4	2,625,885	1,224,478	1,331,995	21,511	2,678,287

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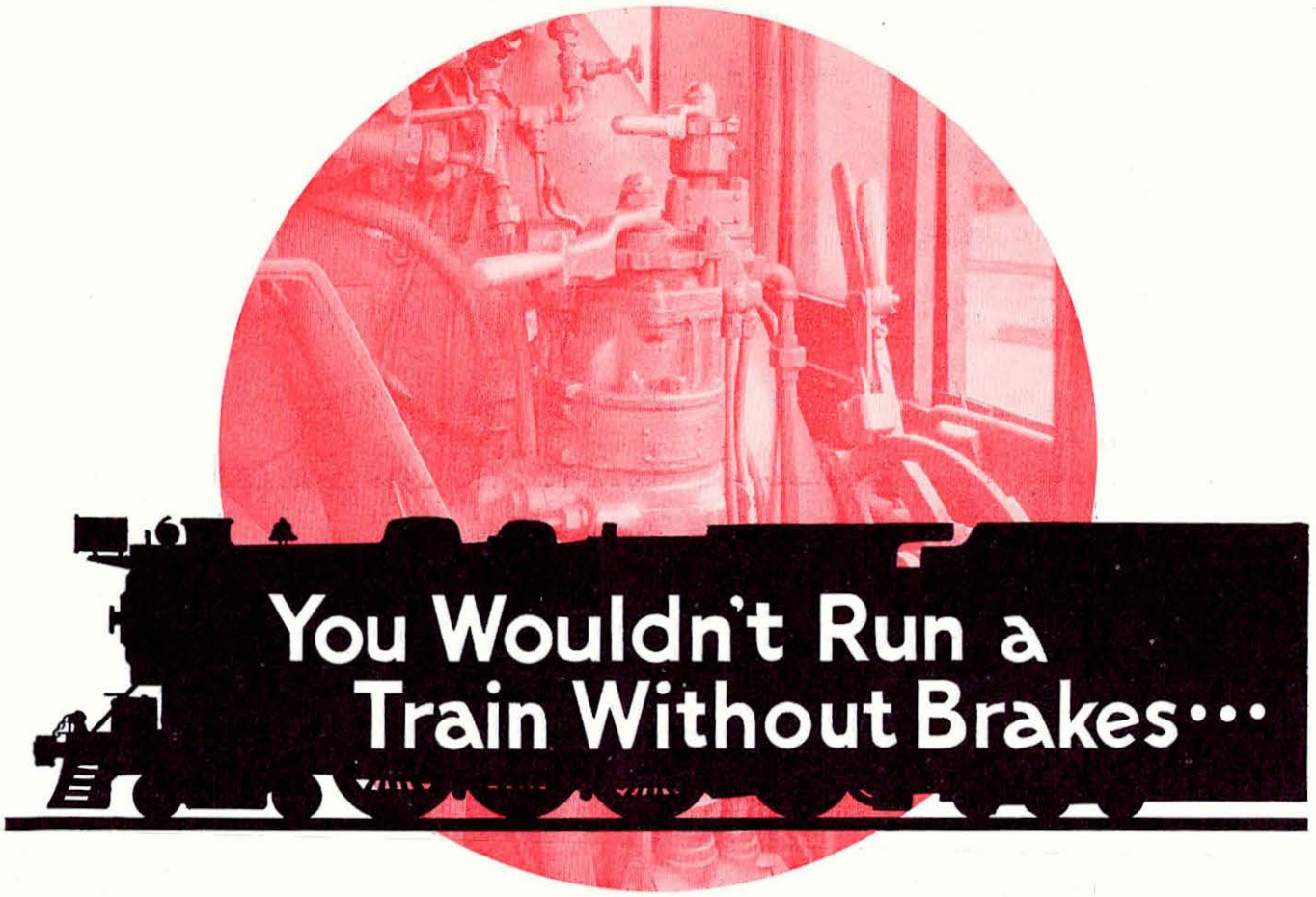

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SWISSVALE, PA.

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr.& retir. 1936	After depr.& retir. 1935	Before depr.& ret.
Fort Worth & Rio Grande	May	233	$25,108	$641	$33,020	$13,115	$8,481	$2,084	$22,372	$48,976	148.3	—$15,956	—$20,559	—$28,981	—$16,743	—$28,930
	5 mos.	233	149,419	3,454	187,592	74,484	40,281	11,208	119,014	260,239	138.7	—72,647	—93,819	—131,010	—127,622	—130,756
St. Louis, San Francisco & Texas	May	261	101,886	700	107,124	39,439	14,335	5,691	47,295	113,275	105.7	—6,151	—12,820	—44,861	—28,019	—44,759
	5 mos.	261	437,575	2,827	460,644	200,682	67,821	27,565	219,746	549,110	119.2	—88,466	—115,729	—273,558	—220,810	—272,794
St. Louis Southwestern Lines	May	1,784	1,503,201	16,326	1,574,061	183,912	254,394	75,593	471,706	1,059,181	67.3	514,880	417,172	276,214	139,073	326,685
	5 mos.	1,784	7,215,728	78,618	7,569,802	803,532	1,195,975	373,897	2,358,237	5,078,925	67.1	2,490,877	2,057,242	1,290,496	1,086,808	1,543,509
Seaboard Air Line	May	4,307	2,537,713	260,693	3,097,296	454,145	643,150	149,023	1,166,088	2,582,669	83.4	514,627	289,627	171,030	187,595	327,007
	5 mos.	4,307	12,532,212	2,257,003	16,535,685	2,251,366	9,320,207	762,014	6,224,988	13,544,489	81.9	2,991,196	1,776,196	1,126,490	1,731,175	1,908,846
Southern Railway	May	6,641	6,080,015	693,201	7,464,175	944,522	1,405,635	144,796	2,628,659	5,416,793	72.6	2,047,382	1,598,286	1,308,584	700,032	1,579,114
	5 mos.	6,641	30,640,417	3,605,315	37,564,783	4,713,007	6,850,591	746,721	13,586,814	27,398,061	72.9	10,166,722	7,932,398	6,511,650	4,590,534	7,864,802
Alabama Great Southern	May	315	453,391	45,996	540,820	86,006	120,456	11,461	165,746	403,074	74.5	137,746	93,348	71,377	289	94,615
	5 mos.	315	2,108,465	209,382	2,510,771	415,401	536,384	55,959	814,040	1,917,263	76.4	593,508	413,741	303,263	28,890	419,456
Cincinn., New Orleans & Texas Pac.	May	336	1,248,150	66,121	1,395,189	168,518	256,178	28,096	322,307	818,983	58.7	576,206	438,073	379,931	239,253	429,899
	5 mos.	336	5,673,184	505,485	6,560,927	869,732	1,184,833	128,241	1,633,435	4,055,751	61.8	2,505,176	1,998,831	1,853,394	1,199,419	2,103,090
Georgia Southern & Florida	May	397	134,926	24,919	178,512	32,388	41,345	2,017	83,162	164,728	92.3	13,784	1,280	—11,471	—10,196	—4,422
	5 mos.	397	606,165	258,782	974,035	153,564	188,452	9,561	444,569	835,553	85.8	138,482	75,908	31,712	—2,856	67,012
New Orleans & Northeastern	May	204	174,525	16,939	208,670	28,215	28,835	5,435	69,193	142,243	68.2	66,427	42,206	23,342	487	29,654
	5 mos.	204	889,903	81,416	1,050,986	144,771	172,001	27,245	352,823	749,526	71.3	301,460	186,732	81,191	28,548	111,708
Northern Alabama	May	100	50,768	1,784	54,602	10,724	1,559	1,353	18,068	33,355	61.1	21,247	17,393	5,222	333	5,293
	5 mos.	100	280,238	8,410	298,055	56,813	7,185	6,168	89,782	168,435	56.5	129,620	109,573	49,275	1,319	49,628
Southern Pacific	May	8,772	9,042,980	1,610,198	11,614,331	1,144,993	2,066,937	331,684	4,506,915	8,821,678	76.0	2,792,653	1,798,640	1,148,265	1,412,015	1,628,874
	5 mos.	8,773	42,412,108	7,677,277	54,379,040	5,658,064	10,018,938	1,511,735	20,746,491	41,889,592	77.0	12,489,448	7,877,461	5,321,618	4,710,369	7,729,079
Southern Pacific Steamship Lines	May	...	451,702	10,685	479,172	15,002	89,441	17,259	331,929	475,780	99.3	3,392	—7,210	—7,462	—63,838	27,905
	5 mos.	...	2,095,913	71,142	2,253,629	77,856	446,866	85,362	1,632,525	2,338,987	103.8	—85,358	—123,368	—124,627	—258,230	52,097
Texas & New Orleans	May	4,430	2,717,039	253,553	3,224,946	514,015	639,646	129,104	1,155,753	2,665,976	82.7	558,970	276,317	90,978	226,869	231,220
	5 mos.	4,429	13,575,973	1,216,567	16,037,415	2,189,577	3,157,191	604,327	5,520,704	12,584,757	78.5	3,452,658	2,179,168	1,289,737	908,575	1,991,422
Spokane, Portland & Seattle	May	946	529,832	37,579	620,039	73,846	69,686	7,779	211,988	391,920	63.2	228,119	159,608	123,344	203,675	140,009
	5 mos.	946	2,431,399	171,794	2,850,491	344,043	392,598	42,202	1,102,484	2,018,650	70.8	831,841	483,666	236,306	396,545	318,790
Tennessee Central	May	286	159,169	5,460	175,525	33,999	27,595	5,771	61,954	139,115	79.3	36,410	28,121	14,377	31,811	20,345
	5 mos.	286	883,618	26,005	967,732	162,112	146,610	28,149	333,222	718,212	74.2	249,520	212,062	151,116	149,757	181,013
Texas & Pacific	May	1,949	1,896,552	181,318	2,262,283	245,502	398,283	75,732	683,242	1,532,408	67.7	729,875	585,735	465,303	302,521	562,747
	5 mos.	1,949	8,909,644	891,872	10,678,094	1,210,985	1,927,692	358,375	3,288,359	7,440,933	69.7	3,237,161	2,588,608	2,004,782	1,577,434	2,490,712
Texas Mexican	May	162	150,099	327	160,351	13,021	15,285	3,064	40,716	79,650	49.7	80,701	74,170	66,089	40,257	67,932
	5 mos.	162	537,348	2,257	588,683	86,432	76,678	16,322	175,467	390,359	66.3	198,324	169,319	138,536	152,764	147,721
Toledo, Peoria & Western	May	239	195,706	6	198,696	44,047	14,835	16,908	45,433	130,431	65.6	68,265	54,966	36,144	—2,361	47,780
	5 mos.	239	924,673	54	937,370	231,982	61,530	82,914	233,669	651,927	69.5	285,443	230,799	145,357	40,541	203,248
Union Pacific System	May	9,827	8,930,926	1,070,603	11,069,278	1,749,322	2,443,038	376,357	3,665,543	9,051,362	81.8	2,017,916	909,256	349,161	396,700	882,923
	5 mos.	9,826	44,545,572	4,768,426	53,969,270	7,158,023	11,646,519	1,587,024	18,879,598	43,077,778	79.8	10,891,492	5,706,929	3,167,044	3,715,133	5,816,087
Utah	May	111	43,458	.....	43,528	11,337	18,798	478	12,270	47,321	108.7	—3,793	—9,665	—3,398	—15,563	6,426
	5 mos.	111	472,120	.....	474,124	75,475	117,128	2,478	115,739	333,919	70.4	140,205	85,383	75,903	17,604	125,008
Virginian	May	619	1,280,785	3,185	1,331,661	110,075	240,596	18,218	230,626	628,476	47.2	703,185	603,185	665,976	562,143	759,316
	5 mos.	619	6,730,558	18,157	7,019,226	507,405	1,240,537	91,704	1,212,750	3,211,712	45.8	3,807,514	3,142,514	3,375,176	2,716,704	3,841,345
Wabash	May	2,447	3,224,224	183,026	3,714,202	497,016	665,375	148,171	1,361,888	2,825,803	76.1	888,399	676,955	403,240	546,117	580,618
	5 mos.	2,447	16,208,872	965,942	18,610,028	2,061,236	3,440,163	703,748	7,103,104	14,085,962	75.7	4,524,066	3,571,186	2,131,902	2,178,864	3,022,432
Ann Arbor	May	293	287,138	2,200	298,972	31,363	74,501	12,036	129,805	260,314	78.1	38,658	20,964	11,073	39,278	31,195
	5 mos.	293	1,550,671	12,809	1,602,747	139,487	365,056	58,935	708,929	1,335,959	83.4	266,788	181,376	121,000	190,681	221,766
Western Maryland	May	882	1,241,796	5,398	1,277,828	194,858	284,311	36,163	322,521	886,961	69.4	390,867	290,867	298,039	288,210	393,070
	5 mos.	882	6,381,443	32,085	6,591,487	789,564	1,475,337	184,089	1,693,932	4,391,866	66.6	2,199,621	1,729,621	1,794,087	1,666,777	2,269,253
Western Pacific	May	1,207	1,095,793	24,729	1,162,505	323,556	241,475	59,631	470,543	1,129,137	97.1	33,368	—52,121	—149,599	149,423	—99,264
	5 mos.	1,207	4,705,434	149,099	4,992,681	1,074,604	1,042,383	278,493	2,161,099	4,774,821	95.6	217,860	—164,410	—510,344	—119,526	—254,699
Wheeling & Lake Erie	May	511	1,144,843	1,140	1,215,902	206,696	285,481	30,613	357,679	912,801	75.1	303,101	119,121	150,505	246,835	239,336
	5 mos.	511	5,414,571	7,897	5,713,268	774,426	1,527,917	152,618	1,742,015	4,355,410	76.2	1,357,858	776,825	861,794	677,698	1,356,164
Wichita Falls & Southern	May	203	33,060	337	40,095	7,105	5,711	1,666	14,403	31,821	79.36	8,274	4,861	2,712	7,899	4,654
	5 mos.	203	170,176	716	197,682	40,711	29,661	8,240	69,857	164,559	83.24	33,123	17,598	7,554	6,902	17,306

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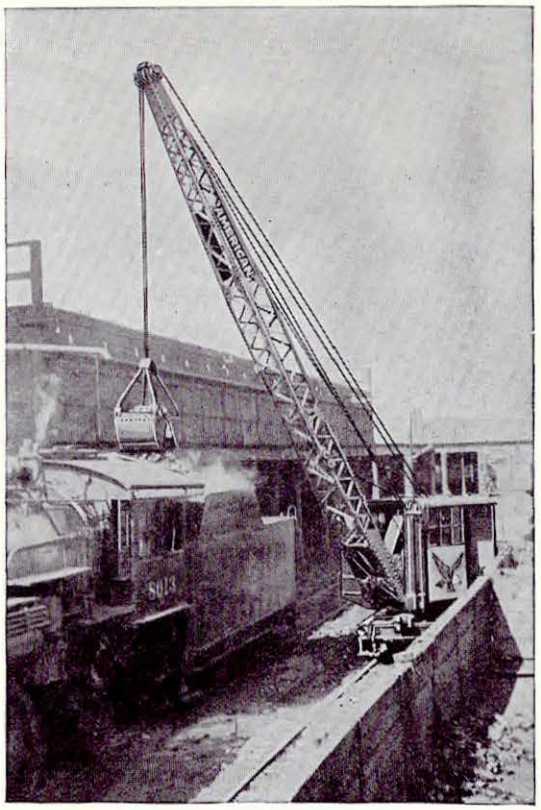

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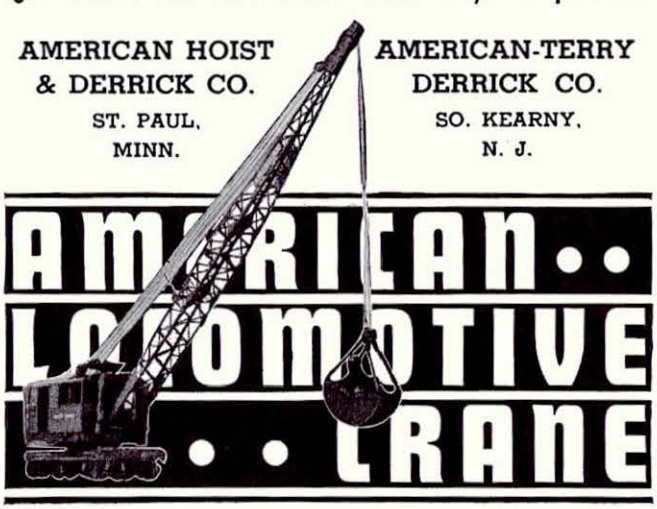

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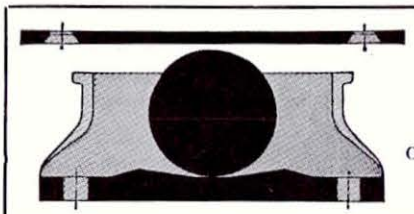

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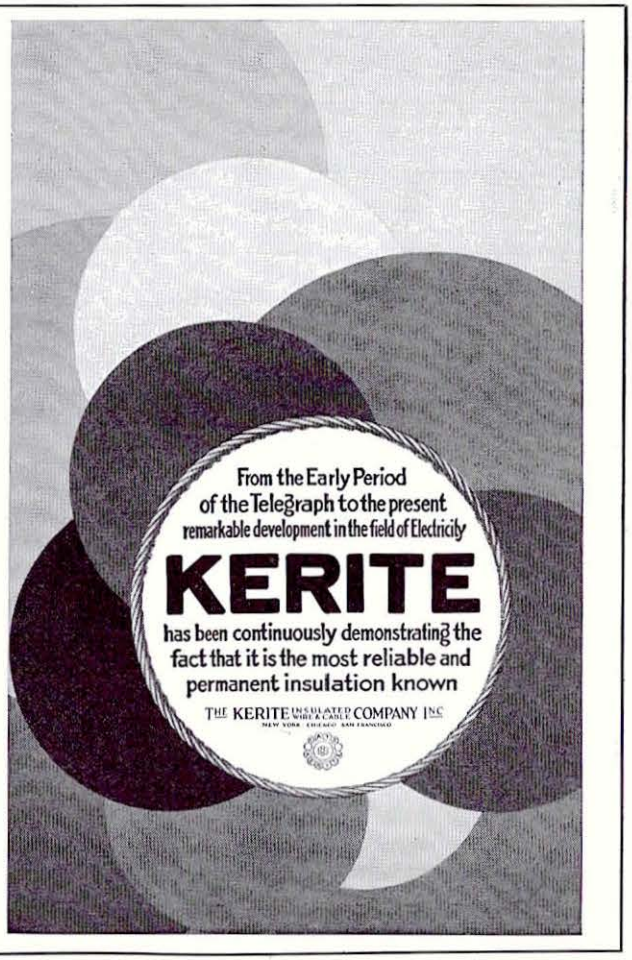
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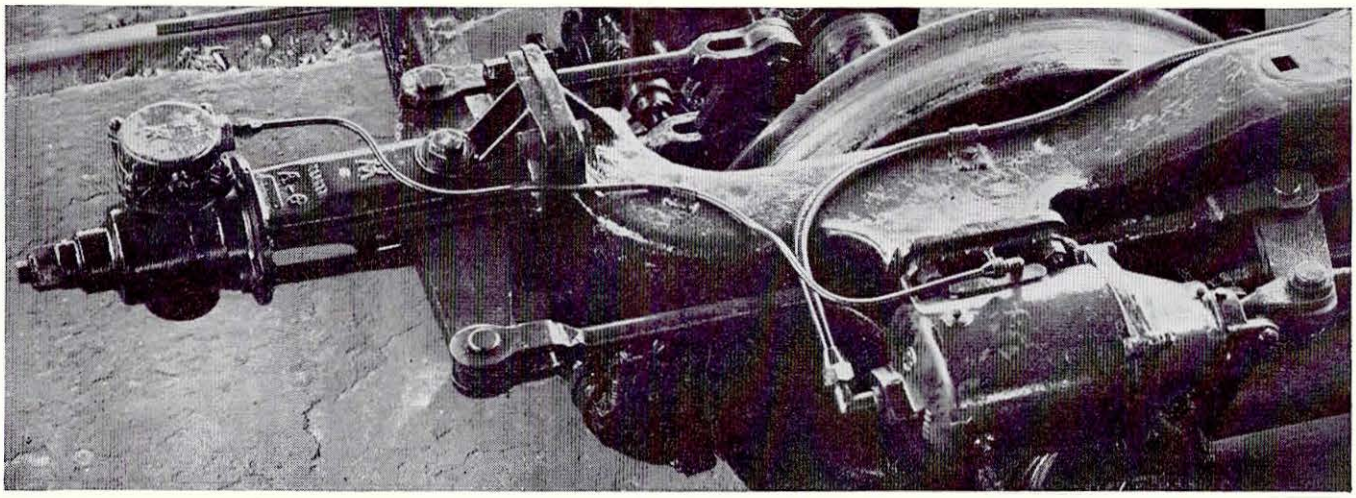
Improved AUTOMATIC Slack Adjusters for Truck Mounting

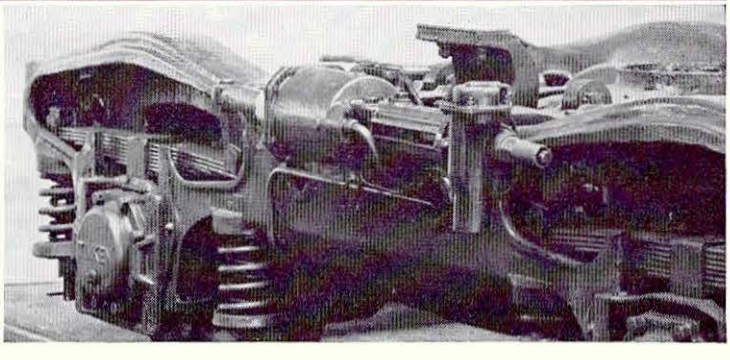


Mounting brake cylinders on the truck instead of the car body is now practiced extensively because of the many advantages—both mechanical and pneumatic. . . . We have developed a new line of Automatic Slack Adjusters to co-ordinate with this form of brake rigging. Many improvements are incorporated, including the "divided engine" in which the adjuster piston and spring are located on opposite sides of the ratchet nut.

Various forms of this new type Adjuster are manufactured to permit attachment to the cylinder head, to the end of the truck frame, or to the side. . . . Several sizes are available to accommodate the braking forces determined by the particular form of brake lever arrangement.

WESTINGHOUSE AIR BRAKE COMPANY

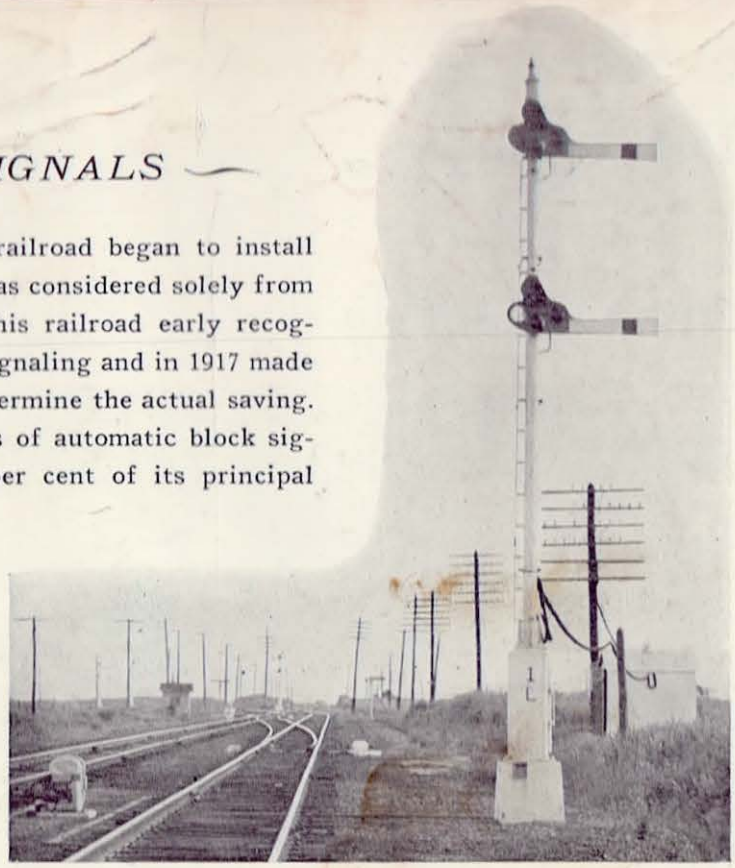
GENERAL OFFICE AND WORKS • • WILMERDING, PENNSYLVANIA

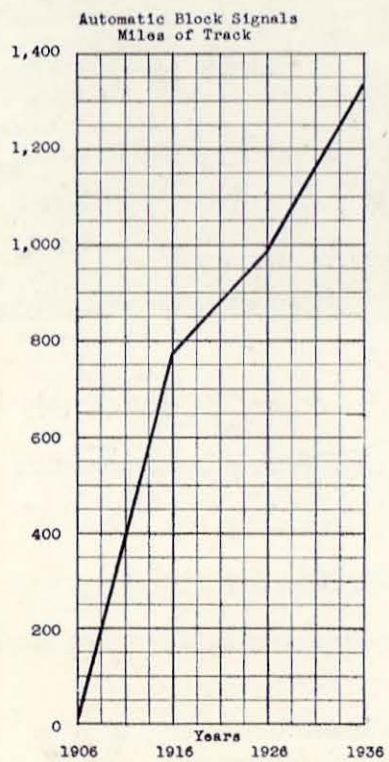


The illustration above shows our heavy duty Adjuster attached to the end of a truck frame; that to the right shows an Adjuster attached to the head of a cylinder mounted on the side of a truck frame.

AS ONE ROAD SIGNALS —

Thirty years ago when one railroad began to install automatic signals, signaling was considered solely from the standpoint of safety. This railroad early recognized the economic value of signaling and in 1917 made one of the first surveys to determine the actual saving. Today, it has over 1,300 miles of automatic block signals in service on over 50 per cent of its principal passenger lines.





The survey disclosed that on a given section equipped with automatic signals, in addition to increased safety in operation, track capacity was increased about 18 per cent and operating expenses were reduced sufficiently to realize an annual return on the investment.

This railroad, which long ago realized the value of railway signaling as a means for safe, expedient, and economic train operation, now has in service in addition to its automatic block signal mileage, four remote control installations, four centralized traffic control installations, and twelve installations of automatic interlockings at railway grade crossings, as well as the customary interlockings, highway crossing protection, and other forms of signaling.

Modern signal systems make the duties of the operating officer easier and begin paying dividends when they are placed in service. There is a signal system to meet any operating requirement.

UNION SWITCH & SIGNAL COMPANY
Swissvale, Pennsylvania

GENERAL RAILWAY SIGNAL COMPANY
Rochester, New York

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HISTORY IN THE MAKING

Of the 157 railroads reporting over 93,000 automatic block signal miles of track in service, 27 have more than 1,000 A.B.S. mileage.